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Discussions on Papers Presented to Congress.

No. 5.—Sterility in the Mare.

By

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Mr. H. P. Standley, senr., occupied the chair at this session of Congress, N.V.M.A., when there was a large attendance of delegates at St. Andrew's Hall, Norwich, on the morning of Thursday, August 27th, 1931. Mr. Standley at once called upon Colonel Todd to open the discussion upon Captain E. Brayley Reynolds' paper "Sterility in the Mare."

Colonel A. G. Todd, C.B.E., D.S.O., M.R.C.V.S.: Before opening the discussion on Captain Reynolds' paper, I should like to express my regret that Professor Macqueen is unable to be present to perform this important duty. He has had a long and varied experience as a consultant in thoroughbred practice and his opinion has always been held in the highest esteem by owners as well as veterinary surgeons who have consulted him. We all deplore his unavoidable absence to-day and hope he will soon be well enough to give the profession the benefit of his experience in this as well as in other diseases of thoroughbreds.

Captain Reynolds states that it has been estimated that 30 per cent. of the thoroughbred mares breeding in one season prove to be barren, and rightly infers that this large percentage should not be classified as chronically barren. Although a formidable task, it should not be impossible to ascertain the approximate number thus affected, as the records of nearly all thoroughbred mares covered from year to year are given in the Annual Supplements of the General Stud Book. Probably only a small percentage would be found to be so affected. In any case, the percentage of barren mares is far higher than it should be and has been steadily increasing. In 1851 it was 20 per cent., since when it has gradually risen to over 30 per cent., in spite of the great improvement in the hygienic conditions of stud farm buildings during the past 50 years.

A short time ago I published a graph, in the May number of *The Journal of the Royal Army Veterinary Corps*, which illustrates the yearly increase from 1851. Studied with other graphs in the same article, it will be noticed that the incidence of sterility began to get higher when two-year-old racing came into force and particularly when the advent of their racing career was advanced from May to March. To meet these altered conditions many breeders arranged for foals to be born in January and February so that they should be forward and sufficiently well grown to stand training for their early engagements as two-year-olds. This entailed advancing the covering season to a time when conditions are very unfavourable for conception. Captain Reynolds has referred to the difficulties there are in getting mares in foal until grass is available. This is the experience of most breeders; in fact, there are many who find it is not easy to get regular foaling mares to conceive during the early months of the year, and in some studs no barren or maiden mares are allowed to be covered before the middle of April. A few years ago, one breeder kept a record of 24 mares covered by one sire. Of 12 regular foalers covered in February and March, 50 per cent. were in foal and of the remaining 12 maiden and barren mares, covered in April or later, 75 per cent. proved to be pregnant, so that the beneficial effects of vitamins and sunlight on the stabilisation of the endocrine equilibrium would appear to be supported by the practical experience of breeders.

There is a consensus of opinion that septic metritis is the predominant cause of sterility in mares. There are no statistics at our disposal to show if it is more prevalent than it was 50 years ago, but clinical evidence indicates that it is, and this is not surprising when we compare the preventative measures taken in Great Britain with those of other countries. In U.S.A. the cordial co-operation of managers of some of their breeding establishments with the veterinary profession in their efforts to keep diseases of the genital tract under better control has been an outstanding success. The measures recommended and adopted were:—

(1) The examination of all mares, per rectum, in September for pregnancy.
(2) The subsequent separation of pregnant from barren mares.
(3) The immunisation of pregnant mares against contagious abortion.
(4) Prompt isolation and hygienic precautions for all cases of abortion.
(5) A routine examination and early treatment of all cases of sterility.
(6) Prompt treatment of mares failing to cleanse normally.
(7) Special covering precautions for mares foaling dead or unhealthy foals.
(8) Hygienic treatment of both sires and dams at the time of copulation.
(9) Research work in diseases of the genital tract.

It has been estimated that the breeding efficiency of the studs which co-operated in these efforts was increased from 20 to 30 per cent.

The same diseases, against which the above steps were taken, are prevalent on many of our stud farms and we cannot expect to make much progress until breeders are persuaded to adopt similar methods. The financial loss to the breeding industry from sterility and abortion is approximately £450,000 a year and although this is widely distributed it surely would be an economical proposition to some of our largest studs, who are the worst sufferers, to co-operate with us with a view of reducing this enormous

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sum! The cost would be infinitesimal compared with the saving effected.

Every year a certain number of mares are received at studs for service which never ought to have been sent. Captain Reynolds has given us some very good instances in which it would be impossible to get such mares in foal. The best way to overcome this difficulty would be for owners of stallions to state in their advertisements that "no mares barren for one year or more will be accepted without a veterinary certificate," or, that "all mares received will be subject to veterinary examination."

I am pleased to see that Captain Reynolds lays great stress on the importance of the systematic inspection of the placenta by a veterinary surgeon. It is surely anomalous that a breeder is willing to spend anything from 1,000 to 10,000 guineas on the purchase of a likely brood mare and to pay from £100 to 500 guineas for the services of a fashionable sire, and then omit to expend a comparatively small fee for a veterinary surgeon to see that all details connected with foaling have passed off satisfactorily! Excellent as many stud grooms are, they do not receive any systematic training, such as nurses receive from the medical profession in connection with births and the care of the newly born, and they cannot be expected to know when the placenta is healthy and complete or when any special treatment is required after delayed expulsion. Our first duty in this respect should be to impress on breeders the importance we attach to the attendance of a veterinary surgeon on thoroughbred mares during the foaling period to ensure that precautions are taken to preclude, as far as possible, sterility supervening on the neglect of observance of some essential hygienic detail.

This raises a further point. What action should our profession take to assist breeders to give their stud grooms a better training? It has been pointed out that their knowledge is now obtained in a haphazardous manner and without any system. Should we not try and help by arranging short elementary courses of instruction at convenient centres for these invaluable helpers? If we do not do so, others, without the necessary qualifications, probably will.

It is appalling to hear that artificial insemination is being performed promiscuously by laymen without the owner's permission. I feel sure that if the attention of breeders was called to this irregularity, most of them would insist on the services of a qualified man.

Although Captain Reynolds has limited his remarks to sterility in the mare, I do not see how we can leave out the influence of the sire in dealing with every aspect of the disease. It is well known that mares failing to hold to one sire sometimes do so readily to others. The explanation is obscure and does not concern us at the moment, but it is interesting to note that the percentage of fertility of the mares mentioned in the Annual Supplements of the General Stud Book as covered by a second sire during the past four years, was as follows:—

	Total No.	Fertile.
1927	82 ...	51·21 per cent.
1928	103 ...	38·83 ,,
1929	91 ...	52·74 ,,
1930	95 ...	47·36 ,,

It is probable that, in several instances, the second sire had the advantage of an April, May or June service, but that would not account for all successful results and it makes one wonder how many of the 1,967 mares recorded barren in 1930 would have been fertile if they had been covered by two sires instead of one!

There is a 60 to 70 per cent. variability in the fertility of the best-known thoroughbred stallions, and although the use of a second sire to obviate sterility is not a practical proposition to all breeders, it is a sound procedure to those to whom a foal is a financial consideration.

Several foreign and colonial authorities have remarked on mineral deficiency as a cause of sterility, low fertility and retention of the placenta in cattle. Little is known how far this affects similar conditions in thoroughbreds, but it is a point which should not be overlooked in any contemplated investigations.

There are other aspects of the disease which will doubtless be brought out by subsequent speakers. I think, however, that Captain Reynolds has made a most practical suggestion in asking us to work together as a team and concentrate first on the prevention of the disease which is of the greatest economic importance to the breeding industry. I hope that this Association will see its way to the formation of a small committee to collect as much information as possible from every available source, so as to enable us to make prompt and valuable proposals to any progressive breeders who may desire our co-operation in the near future.

Hitherto, members of our profession enjoying lucrative incomes from thoroughbred practice have kept their experience to themselves. We are more fortunate in now having at racing headquarters a distinguished confrère who gives us freely the benefit of his observations on every available opportunity. It is no easy matter for anyone, with so many demands on his services as Captain Reynolds, to find time to write articles and address meetings, and I think I shall be expressing the feelings of everybody here when I say how very grateful we are to him for his most interesting and valuable contribution. (Applause.)

Mr. W. F. Aston (Shrewsbury) said that the subject was one of great interest to him, and after examination of the paper he was disappointed with the tale of universal endometritis. He felt confident that a most useful addition to their knowledge of sterility would have been given them. Like horse dealers, he expected the essayist had kept his best tale till the end.

At the bottom of the first page it was stated that thirty per cent. of thoroughbred mares were barren. He agreed that they were very bad breeders, but not sterile. Why? Among the many characteristics transmitted by breeding, productivity was one. For instance, sows and ewes were selected, kept and bred almost as much for this character of the power to reproduce, as for shape and size. This had been completely ignored in thoroughbred stock. "Bred to race" was the only factor, and had been so for three centuries—as a natural sequence a low fertility had resulted. He based this statement on a comparison between Shire Horse breeding. Here the mares must be regular breeders, and he affirmed that in comparison with blood stock only twenty per cent. were sterile.

The comparison with Shire horses drew attention to the difficulty often experienced in getting maiden blood mares to breed. This trouble was much more rare in the farm horse because of the filly's more natural life

compared to that of the forcing and racing of the thoroughbred mare. They were all aware of the difficulties encountered in the first two years to get three and four-year-olds into good stud condition. Surely there must be such an upheaval of endocrine metabolism as almost to ruin some parts of the reproductive organs. Granted this, the essayist then said " metritis," but the organ least exposed to such change would be the uterus, as, although the uterine wall when gravid secreted an endocrine, it probably had little or no function when the womb was empty.

Was there any proof that degeneration of one portion of the reproductive organs could produce a metritis? Had ovariectomy ever produced a metritis? He thought not.

There was little to be said for endometritis's sole claim as the cause of sterility in bloodstock.

When they left endometritis there was little else definite in the paper. On page 5 were a few cursory remarks on vitamins. That seemed to be very dangerous ground. Thoroughbred stock had been got in the best condition and, if any question of deficiency arose, were treated with the whole gamut, even to violet rays. Since they were not in a position to say what were vitamin deficiencies, they might just as well say " and these are barren too."

On page four there were a few lines on insemination. Except as a means to save the stallion, was insemination any earthly use? He doubted if it successfully impregnated one mare in a hundred which would otherwise be barren. What particular cause of barrenness had been overcome by giving the sperms a lift on the way?

He congratulated the writer on the absence of therapeutic tips and at the same time deplored the absence of a good pathological, histological and bacteriological description of septic endometritis as noted on page four.

He considered that the subject of sterility in mares would only be satisfactorily dealt with when carefully collected data on normal œstra, œstral periods, wombs, ovaries, cysts and endometritis, as met with by them as clinicians, were put together and balanced as Williams has done for the cow.

Professor W. M. Mitchell (Edinburgh) observed that some of them might know that he had been interested for some few years in questions of bone and joint trouble, and that had necessitated the making of a large number of *post-mortem* examinations. He had been struck with the pathological conditions which occurred in the horse, and he could not help thinking that sterility was bound up with a much greater problem than disease of the genital organs alone. He agreed with Captain Reynolds that endometritis was the commonest cause of sterility, but he thought that endometritis was merely a local sign of a general disease affecting the whole body. Touching upon the question of vitamin deficiency as the underlying factor, he pointed out that vitamins must come from the food, or from other outside sources, and as yet they knew very little about the function of vitamins in the large domestic animals. It was only by experimental work that the question of whether these were of any importance or not to our animals would be solved. Some of the conditions met with in his *post-mortem* examinations were very suggestive of vitamin deficiency. In the stomach one might often find gastric ulcers in horses which were destroyed for a local joint condition, and he suggested that in the course of general *post-mortems* such conditions should be looked for.

Mr. McCarrison, in India, working on problems of diet and disease, recently gave a lecture in London to the Royal College of Surgeons, and he thought that lecture was going to revolutionise the outlook on surgery. For instance, he could produce stone in the bladder more or less at will in experimental animals and showed also that gastric ulcer and numerous other diseased conditions depended on diets deficient in vitamin A-bearing foods.

The common foodstuffs used for horses were oats and hay, and he wondered whether foodstuffs of that nature were not responsible to a certain extent for what he might call the under-current of disease affecting the horse. Not until experiments were done in regard to this, could they say very much as to the effect of foodstuffs on their animals. Shetland ponies were exceptionally free from disease, and that was probably because they lived under natural conditions.

By ill-balanced diet McCarrison had also produced endometritis in rats, which was found to be due to a lack of vitamin A. He did not think that actual treatment of cases of sterility in mares was going to help them very far. What they wanted to get at was prevention—did not some of those conditions really commence in the young animal even before birth? In the North their mares were largely kept housed in the winter time and they certainly got very little fresh food, and what they did get was of very doubtful value from the point of view of vitamins, and it was possible that under such conditions diseases had their origin even before birth. Many foals were born dead—others died soon after birth from joint-ill and various other complaints; then, later on, one found foals developing large hocks, and further pathological links could be filled in of the general disease problem as the horse grew older.

Professor J. F. Craig (Dublin) said that sterility in all animals was an extremely interesting and at times a perplexing problem, and it was a matter of great monetary importance when it affected the thoroughbred. He had been making inquiries into the frequency of sterility of thoroughbred mares over a series of years in Ireland and the result of his inquiries agreed with the statement of Captain Brayley Reynolds. It was found that the percentage of mares which did not breed every year over a series of years varied from 30 to 33 per cent., while abortions amounted to only about 1 per cent. The causes of this barrenness appeared to vary a great deal and at times one could only speculate as to what factors were responsible. One could not state with any degree of accuracy at the present time the relative frequency of the various causes of sterility in mares. He had no doubt that some mares were shy breeders and would carry a foal only every other year and that nothing could be done in these cases. But in any event it was difficult to distinguish them, save perhaps by a method of exclusion and the absence of any factors, whether related to actual alteration in the genital organs or not, which would militate against pregnancy. In this connection it was well to remember that thoroughbred horses were bred for speed and stamina and little attention was paid to their breeding propensities. Little notice was taken of the absence of

a possible hereditary fertility factor The effect of early racing upon breeding had been regarded as adverse, but in what way that could come about required further explanation.

He agreed that an extremely common cause of sterility was endometritis. In his experience the bacteria most frequently found in such cases were streptococci, sometimes staphylococci, colon bacilli, aspergillus, but in none of the cases he had encountered had *Bacillus abortus equi* been detected. The treatment of these cases was for the most part the application of antiseptics, such as iodine or acriflavin, to the uterine mucous membrane, but he found that a useful adjunct was an autogenous vaccine. Frequently the treatment had to be prolonged and on that account, before a cure could be effected, the mare could not be sent to the stud during the current season. This arose from the fact that the condition of the uterus was only ascertained when the mare was being examined prior to service and then treatment was called for. It would, therefore, be in the interests of owners to have mares not in foal examined at the period that Major Pallin advised, so as to allow a reasonable time for treatment should it be required. He had noted occasional cases which had evidently a small degree of uterine catarrh which were successfully served and proved in foal. Perhaps in some cases the endometritis was not the primary cause of the trouble; it might have been the end point.

That was evident, of course, in those not infrequent cases which were mentioned by Captain Reynolds in which the vulva had been torn at parturition; the tear was never attended to, the vagina was flaccid and aspiration of air and infection took place into the vagina and uterus. These were difficult cases to handle.

In all cases where mares did not breed it was necessary first to make a thorough examination of the genital organs both *per rectum* and *vaginam* before forming an opinion as to the cause. If any abnormality was found during the examination, then attempts should be made to correct it if that were possible. Some abnormalities, of course, might not be apparent, as *e.g.*, blocking up of the oviducts with catarrhal or inflammatory products. This would not be thought of unless uterine catarrh was associated with it. If the abnormality was not thought sufficient to account for the inability to breed, then some of the other factors should be considered.

These factors would include any deficiencies of the diet in such materials as calcium and phosphorus or in vitamin E, or even deficiencies in some of the hormones of the endocrine glands, particularly the thyroid and pituitary bodies. In such cases the treatment would be speculative. The importance of vitamin E had yet to be determined in the large animals, but wheat germ oil or other agent rich in vitamin E ought to be tried in some of those mares which were not breeding and in which no gross abnormality could be ascertained.

He thought that Captain Reynolds was on the right track when he advocated the adoption of hygienic and preventive measures at and after foaling. There seemed, however, to be a certain amount of vagueness in the paper as to what exactly should be done, and he would illustrate this point by asking two questions.—(1) Where mares foaled normally and there was no morbid discharge or alteration in the fœtal membranes, would he advise that an antiseptic pessary be inserted into the uterus to ward off infection? That precaution was now frequently being recommended and there was a good deal to be said in its favour.

(2) Would he recommend that mares should not be served at the first œstral period, say about the seventh to the ninth day after parturition, but that service be delayed to the second period? It had been shown that frequently mares did not hold to the first service and it was argued that so short a period had elapsed after parturition that involution of the uterus had not been completed within seven to nine days and that the uterus was not properly prepared for the reception of another embryo. Moreover, the condition of the uterus, if service took place then, predisposed to infection. The arguments in favour of this view appeared to warrant careful consideration.

Research and enquiry were urgently required in connection with the whole question of sterility, but the cost with reference to that section of it dealing with thoroughbreds would be very high and yet the result would abundantly recompense for any expenditure in this direction. He estimated that the annual loss in Ireland alone from the inability of mares at stud to produce foals annually amounted to about £250,000. How much of that loss was preventible could not be estimated, but it must amount to a very large sum of money. He was, however, led to understand that adequate provision for this department of research was only likely to be provided if and when the totalisator was shown to be a great financial success.

Mr. G. P. Male (Reading) said that in opening the discussion on another paper a short time ago, Captain Reynolds had laid down the dictum that papers should be criticised and if necessary, severely, and that the essayist should not be patted on the back. In this case he did not wish to criticise the paper too severely, and he hoped that any remarks he might make would not be regarded as of a personal nature.

He was profoundly disappointed in reading this paper. Knowing the ability of Captain Reynolds and knowing the extent of his opportunities in the thoroughbred world, he had hoped to get some valuable information with regard to this very difficult problem. Instead of that, Captain Reynolds had drawn the blackest picture of ignorance of all concerned in the treatment of this condition. He could not believe that the conditions and strictures that the essayist passed on all those connected with thoroughbred breeding were really meant. If they were, they were a very great reflection on the veterinary profession.

The essayist had on occasion stated publicly that 80-90 per cent. of mares are sterile from metritis, and as they understood from the paper that thirty per cent. of thoroughbred mares were barren each year it would mean that about a quarter of our thoroughbreds are suffering from metritis. Had he any figures to substantiate that statement, as he would not like it to go from that hall that they agreed with those figures, because if those people who came to this country for their thoroughbred stock believed that a quarter of all mares in this country were affected by metritis, it would be a very serious handicap to thoroughbred breeding. He must refute that statement—it was not his experience at all.

The essayist held the opinion that mares that were often barren, or even those that had had a good breeding record, but were difficult to impregnate, "might have weakly progeny equally difficult to impregnate or they might be sterile," and he had on another occasion said that "to render such animals capable of breeding might economically be very unsound."

Following up those figures, did it mean that a quarter of their thoroughbred mares should be scrapped? He, the essayist, believed that sterility or inability to breed was hereditary and yet he had stated "the vast majority of cases of sterility are due to metritis." How could that be the case when metritis was an acquired condition?

There was also another point on which he wished to remark and that was on the strictures Captain Reynolds had passed on those veterinarians connected with thoroughbred breeding. The essayist had said "whatever reputation they may possess or may in future gain is assuredly doomed to be lost. Should these wise men adhere to a strictly rational and scientific application of their methods, which judged by the past is more than doubtful, the number of cases they may successfully deal with will be so limited that the total number of cases of sterility will not be materially affected and could be ignored." Although they might deplore the methods of some veterinarians, those remarks did cast a serious reflection on those who were trying to do something to advance the knowledge of their profession and they certainly were not conducive to that co-operation which he had asked for and for research into this condition. Those remarks were hardly worthy of the essayist. With the rules relating to the management of a stud farm they all agreed, and one could hardly understand how it was they should have been emphasised—one would have thought that they were in practice from the time of Noah, because they were very necessary and essential things in the management of a stud. The examination of the fœtal membranes had been in practice, to his knowledge, for at least 40 years, and the ordinary rules with regard to cleanliness in mares and stallions had been put into practice from time immemorial.

Captain Reynolds mentioned perineal injuries and he agreed that they were very important and the slightest tear of the genital organs should be attended to at once. It was very easy to do it just after foaling. With regard to the causes, he was sorry Captain Reynolds did not deal more fully with those—he seemed to have got it into his head that metritis was almost the only cause, for he said "the number of cases due to other causes other than congenital deformity or inefficiency, and which would always be with us, are so few that for the purpose of this paper they may be ignored." He did not agree with this.

As Colonel Todd had said, the stallion was almost as important as the mare and it was known very definitely that a great number of cases of sterility in the mare were really due to the inefficiency of the horse, and recent experiments that had been made proved that fertility in the male depended a very great deal on the mass of spermatozoa that was injected.

In his opinion the ovaries had a very great deal to do with infertility in the mare. There were various ways in which these could be treated, and he would like to have heard from Captain Reynolds how he would treat these cases. They knew he was against various methods of treating barren mares.

He had two cases that season where the mares had not been in season for some months after foaling and the owners were getting anxious as to whether the mares would come on or not. He treated those mares and they both came in season on the fifth day. They were treated with ovarian massage and there was no doubt that, seeing they both came on on the fifth day, and he had done it on many occasions, that was the treatment necessary.

With regard to vitamins, if there was one animal that could get a proper supply of vitamins, it was the thoroughbred, because thoroughbreds were turned out every day whatever the weather was, and they were well fed when they came into the boxes, and they got sufficient grass. He doubted if the want of vitamins had much to do with sterility, in the thoroughbred mare, at any rate. The vitamin which was responsible to a great extent for the stimulation of the functions of reproduction was vitamin E. If vitamin E could now be supplied to some of those mares they would see whether it had any effect. Had Captain Reynolds made any experiments in that direction?

Of course this was a very important subject and involved so much loss in breeding that we should do all we could to try and help forward any solution for it, and he would especially like to see further researches on this subject, even apart from thoroughbreds—other animals should be studied as well. He had done grafting experiments on bitches and it was extraordinary the results one got; even when they had not been in season for years. There was no metritis in these cases. Other animals also responded to this treatment. He could not help thinking that, in a good many cases in the mare, reproduction could be brought about if the necessary stimulus to the ovarian functions was supplied. He would like to compliment Colonel Todd on his excellent suggestion, and he hoped it would be carried out all over the kingdom with that co-operation which Captain Reynolds had asked for, and he hoped that Captain Reynolds would not think he had made those criticisms in any unfriendly spirit.

The Reply.

Captain E. Brayley Reynolds, replying, said he would like first of all to express his thanks to Colonel Todd for coming to open the discussion on that paper. Professor Macqueen had been originally put down to open the discussion, and, while in no way wishing to detract from his appreciation of Colonel Todd's presence and the able way in which he had opened the discussion, he was sure they would all have been pleased to have had their late President with them to have performed that task. (Hear, hear.) For himself he could not help thinking he would not have been let down so lightly as he had been by Colonel Todd. (Laughter.) In passing he was pleased to inform them that he had recently heard through a mutual friend of the good progress Professor Macqueen was making, and he was sure they all wished him a speedy and complete recovery. (Cheers.)

Very little time had been left him in which to reply; he had, however, been greatly helped in this respect and his own reply shortened by the remarks of Professor Mitchell. The latter was quite right in thinking that he considered it highly probable that vitamins had a greater

bearing on this subject of sterility than had generally been accorded to them. He endorsed all that he, Professor Mitchell, had said, even to the early infections.

It was quite impossible as busy country practitioners to keep themselves fully informed of all the work of scientific investigators, but, even in trying to keep himself in superficial touch with the results of their labours it had been borne in upon his mind that the solution of this question of sterility was wrapped up in some of the latter-day discoveries. There was, however, a great mass of knowledge that had yet to be sifted and apportioned its proper bearing on this subject. What little understanding he had gained had still been sufficient to convince him of how little he knew in regard to this subject of sterility. It had, at the same time, convinced him of how little others knew; and he was certain, from the information there was at their disposal, that it was ridiculous to attempt to lay down any hard and fast solution of the problem.

Time did not allow of his answering in detail the various points raised. It had been remarked by two speakers that they did not think that vitamins had much bearing on the subject. He had already referred to his view of the importance of vitamins in regard to sterility, and personally he thought time would prove that they had much more to do with it than was now thought possible. Mr. Aston had asked why thoroughbreds were bad breeders, and had inferred that Shires were better breeders. He had understood him to use this as an argument that vitamins could have little bearing on the question, because according to his, Mr. Aston's, view, the thoroughbred lived under the best conditions; it was better fed and more carefully looked after. He, the speaker, thought that just the opposite deduction should be made from comparing results in the two breeds. The Shire lived under much more natural conditions and probably was receiving vitamins in a more natural form and correct proportion, whereas the so-called good feeding in the case of the thoroughbred was really forced feeding while young in order to get early maturity, and it was more than likely that its food was deficient just in those particular vitamins that were necessary for healthy functional development. The so-called balanced ration was often deficient in vitamin content. Had this not been observed in the milking cow?

Mr. Aston had also referred to insemination: he doubted whether any benefit was obtained by resorting to it. It was, of course, impossible to claim that one had succeeded in getting a particular mare in foal as a direct result of insemination; but results obtained with a number of mares seemed to indicate that insemination was beneficial. He himself believed in it. Some mares, although they had a slight catarrh of the womb (and catarrh of the womb in most cases indicated infection even if slight) did become pregnant. He thought that insemination in such cases assisted towards this result.

Colonel Todd had referred to the greater effort that was made in America successfully to deal with the question of sterility. There they took steps to ascertain at a comparatively early period after the conclusion of the breeding season whether a mare was in foal or not. They did it by rectal examination, and they were able to express an opinion with a high degree of reliability, even within about 30 days of service, whether a mare was in foal. By thus picking out barren mares at a very much earlier period their genital organs could be examined and any treatment considered necessary carried out. In this country one was not asked as a rule to examine a barren mare until the breeding season had begun. If, under these circumstances, any treatment was necessary, it was much too late for it to be carried out. Treatment necessary for it to have any prospect of success extended, in some cases, over a long period, a whole year or even longer. He thought he was right in saying that in America, owners had been educated up to the point that they should be prepared in the case of valuable mares for treatment to be extended over a period of even two years if there was a fair prospect of its being successful. He was afraid it would require, at the present time, a lot of persuasion on their part to convince an English owner to consent to such a trial.

In regard to the figure of £450,000 mentioned by Colonel Todd as representing approximately the total annual losses sustained by breeders, he presumed that it had been arrived at by totalling the stud fee of all stallions, striking an average according to the total number of stallions, and then calculating the loss according to the total number of barren mares. He thought that in this way too high a figure might have been arrived at; because, in his experience, the greatest loss was in regard to the low-priced stallion. Except in well-known cases, mares going to the high-priced stallions showed a relatively high degree of fertility. Factors bearing on this were that an owner was not likely to send a mare to a stallion serving at 400 guineas unless there was a good prospect, as far as he knew, of her getting in foal; and, on the other hand, those in charge of such stallions did not, as far as they could avoid it, accept mares to them with bad breeding records.

It had been said that he had not referred to the sire as a cause of sterility. He might perhaps, in passing, have mentioned this as a cause of some of the barrenness in mares, but he would point out that he had written of sterility in the mare—not barrenness.

Colonel Todd had suggested the advisability of forming a committee to consider this subject so as to get co-ordination and co-operation. He, the speaker, fully endorsed that suggestion, because he thought it was the only way progress might be made.

Rejuvenation and Gland Grafting.

The following article, from the pen of Mr. William C. Miller, M.R.C.V.S., of the Institute of Animal Genetics, Edinburgh, appears under the above heading in the "Notes and Memoranda" Section of the July, 1931, number of *The Eugenics Review* (Vol. xxiii, No. 2, pp. 155-157).

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In the course of a paper* read to the Central Division of the National Veterinary Medical Association Mr. G. P. Male describes clinical results which, in his experience, have followed the inplantation of gonads into various

*Gland Grafting and its Economic Value. By G. P. Male, M.R.C.V.S. *Veterinary Record*, Vol. xi, No. 18, May 2nd, 1931, pp. 484-94.

domesticated animals of both sexes, which had apparently ceased to breed. Specific instances are given of what are regarded as successful results in seven dogs (six females and one male), two mares, one ram, one bull and one boar—these twelve animals are stated to be a representative sample of a larger population, but the total numbers are not given.

The technique employed was simple. Gonads from an animal of the same species and sex, but not necessarily of the same breed, were used. They were removed aseptically, trimmed so that all accessory structures (epididymis, oviduct, ovarian ligament, etc.) were removed, and then, either whole or bisected, they were implanted in subcutaneous pockets in neck, breast, or flanks of the recipient. Aseptic precautions were, of course, observed in each case. Some stress was placed upon rapidity of removal and implantation.

It appears that the only clinically uniform indication for operation was that the animal, male or female, which had or had not reproduced previously, was at the time of the operation infertile in mating. No details are given of endeavours to differentiate clinically or otherwise between the various possible causes of this infertility, although in one case "injury to one testicle," and in another, septic metritis, are quoted as having been concerned. To avoid misconception here, it should be emphasised that one of the most difficult problems with which the animal clinician is faced is the determination of the cause of a cessation of reproduction in the *living animal*. Upon *post-mortem* examination the determination of the ætiology of sterility or infecundity not infrequently baffles the investigator even though he has the resources of an efficiently-equipped institution at his command.

It is exceedingly unfortunate that more details were not given concerning the fate of the implanted gonads. The words "graft" and "grafting" are used throughout, and it is stated that the "grafts" "take." In the light of the experiences of numerous other workers, and as a result of experiments carried out at this institute during the last three years, it is highly desirable to point out that there is a grave risk of error in assuming that a piece of an organ or tissue inserted in a pocket below the skin, which neither suppurates nor disappears within a reasonable time, is a "graft" which has "taken." The criterion of grafting, as distinct from implantation, would seem to be that the new tissue shall establish a complete vascular connection with the host and shall continue to function in its new environment for a reasonable time. For this to happen it is obvious that the site chosen shall be one where there is little or no normal movement, and where the vascularity is luxuriant. The region of the neck may meet the requirements to some extent, but for colonisation of the introduced gonad, fixation by sutures would be necessary. The development of cutaneous muscle in neck and withers of the horse for instance, is such that an unsutured body like a testicle or ovary, with a smooth and slippery surface, cannot remain stationary for a sufficient length of time to allow granulation tissues to become vascularised. What then happens to this implanted gonad? As a general rule, when sterile animal tissue is introduced into a subcutaneous pocket in the body there is, after the first preliminary exudation of lymph and serum from the bruised host tissues, a rapid proliferation of fibroblasts—a part of the normal process of obliterative repair of a subcutaneous cavity. There may or may not be a lymphocytic invasion, according to the local reaction of the tissues to a foreign protein.

The fate of the tissue so introduced depends upon its own vitality and the rapidity of the processes of encapsulation by host fibrous tissue. Thus, specialised tissues—such as the noble elements of the gonads—degenerate earlier than does the stroma of these organs. After implantation the thick tunica albuginea of the testis survives longest, the basement membrane of the seminiferous tubules next longest, while the germinal cells and the interstitial cells are the first to undergo degeneration.

To a very large extent the same is true of the implanted ovary. It would seem, therefore, exceedingly difficult to believe that by using the technique outlined by the author —in which whole or halved gonads were implanted—functioning of the implants could be obtained. It would be necessary to demonstrate by direct methods of sectioning, rather than by clinical examination of the site of operation by palpation, etc., that the implanted tissues preserve their histological integrity for a reasonable time after implantation. No clinician, no matter how skilled, could detect the difference between an implanted gonad which had become enswathed with fibrous tissue and was in process of encapsulation, and one which had secured vascular connection with the host and had become functional. It is not here suggested that such connection and functioning cannot or did not occur in the cases under consideration, but in view of the fact that other workers have found that gonads taken from an animal before it attains puberty, and preferably when still juvenile, will "take" in a new host much more satisfactorily than will post-pubertal gonads, and in view of the mass of evidence which shows that in the larger domesticated animals there are great difficulties in the way of successful gland-grafting, it is most unfortunate that no histological evidence was submitted by the author to support his claims that his "grafts" had "taken."

Equally unfortunate is it that, as one of those taking part in the discussion pointed out, no details of the etiology of the infertility of this or that case could be given. It is hardly to be assumed that the implantation of a gonad into any animal of either sex which happened to be infertile would invariably and miraculously result in a recrudescence of fecundity, sexual potency, and an enhancement of the bodily functions generally. In some instances, owing to a slight disfunction of these mechanisms in the female which culminate in the œstral crisis firstly, and in conception and pregnancy subsequently, it is reasonable to believe that the endocrine disturbance resulting from the introduction of a healthy and functional female gonad into the body might provide the necessary stimulus (or "kick") which restores harmonious function to a temporarily dislocated mechanism. It is even possible that the considerable shock resulting from the operation itself —a shock which is accompanied by a mobilisation of endocrine reserves (*e.g.* adrenal activity)—may have resulted in a re-adjustment of hormone balance.

Where, however, more profound changes in pituitary, ovarian, adrenal, or thyroid balance have occurred, it

is impossible to accept the idea that introduction of gonadic tissue will act as a restorative of normality. The internal secretions of the testis and ovary play certain definite parts in the physiology of reproduction, but the influence of the anterior pituitary is equally important. It could be postulated that implantation of a gonad from either sex exercised a stimulating effect upon the host's own anterior pituitary mechanism, which in turn exerted a gonadotropic effect through normal channels and resulted in a return of the reproductive powers. Similarly it could be postulated that implantation of an active healthy ovary taken from a female in the pre-œstrous stage, might be able to release a sufficiency of female-sex hormone, when in its new environment, to produce those preparatory changes in the the host's uterus which are essential for nidation of the fertilised ovum, and which the host's own ovary had not been able to accomplish.

But neither of these hypotheses can be considered other than tentative in the present light of our knowledge of the details of the physiology of reproduction. In any case, and in spite of the adverse opinions expressed during the course of the discussion of this paper, implantation of gonads taken haphazard from other animals and implanted haphazard into those which, from unknown causes, are temporarily or permanently infertile, is certainly not destined ever to compete economically or anyhow else with the administration of measured doses of appropriate standardised extracts given with a knowledge of the particular hormone deficiency or unbalance which it is desired to reinforce or correct.

It is unfortunate that a certain amount of what can only be described as " loose talk " took place in connection with the supposed possible influence of a graft from an animal of a breed or colour differing from the host. To adumbrate a hypothesis that introduced hormones might alter the characterisation of genes or chromosomes was either brave or foolhardy; to argue hotly for or against such a hypothesis seems to us to have been a waste of time, and it does not appear profitable to waste further time upon it.

A General Consideration of the Unsoundness Problem in the Horse.*

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If I were to ask you what you considered the most important thing in the determination of treatment, most of you would no doubt say ' diagnosis,' but if you will consider the following two cases I think you will agree that the second is by far the more difficult, because prognosis and not diagnosis is the guiding principle of treatment.

(1) When we examine a horse for soundness and find, let us say, a ringbone, we conclude that the horse is unsound, and in most cases, having expressed our opinion, dismiss the case from our minds. This is a problem of diagnosis.

(2) When we are called in to treat a horse suffering from a ringbone the owner wishes to know whether the animal can be restored to usefulness, and very often the economic side of the question of treatment must be considered at the same time. This is a problem of prognosis.

Diagnosis is largely based upon the clinical signs which impress the examiner and it is fairly easy to convince clients or students concerning facts. In prognosis, however, much more is required than the mere detection of signs of disease —we need to assess their value. To assess the value of a sign is to understand its relation to the vital processes of the body upon which the life and health of the particular animal depend. To obtain such knowledge of disease it is necessary to study the circumstances which induce its onset, the earliest signs of its presence, the modification of these signs as it progresses, with all the variations which occur until death or recovery. I know of nothing more difficult to teach than prognosis, and must confess that often, if I were asked to explain the value of clinical signs in coming to a prognosis, I would have to confess that I could not explain them except as being based upon my own experience. For instance, if I had examined a horse some years ago and found he was a grunter I would probably have condemned him as unsound, founding my opinion upon the diagnosis of the condition and the faith placed in dogmatic assertions gathered from those whom I considered as men of experience. I could not give an honest reasoned prognosis regarding grunting. Nowadays I would have no hesitation in condemning a grunter as unsound, because I could place a definite value upon the clinical sign, which would be, that the horse was suffering from a general disease likely to lead to the animal becoming useless for work as a result of various possibilities developing, such as ringbones, sidebones, shivering, and also the positive evidence that grunting is associated with degeneration of the laryngeal muscles.

I have digressed in this way in order to try and create interest in the values which we should attach to signs and thus try and rescue much of our treatment from pure empiricism by founding it more and more upon a reasoned prognosis. In this way I think that those who are interested in practice and especially those who are in touch with breeding stock can carry out research, admittedly slow in its progress, by keeping watch upon the deviations from health and noting the future variations as the animal grows older.

The General Problem of Unsoundness.

It has been my aim to try and place some such prognostic value upon the diseased conditions so commonly met with in the examination of horses, both for soundness and for purposes of treatment, and to this end I have been gradually working back to earlier developments of what I take to be a generalised disease.

Starting with the clinical condition known as shivering, I have found that in all cases subjected to *post-mortem* where this condition was present the morbid changes were widespread. The most marked naked-eye feature of a thorough *post-mortem* is the constant occurrence of multiple osteo-arthritic lesions and microscopically marked changes in the peripheral nerves, especially the sciatic. There are other common lesions which I have described elsewhere,[1] so I will not burden you with further details here.

I have been able to examine animals from two years

* Paper presented to the North of Scotland Division, N.V.M.A., at Aberdeen, October 3rd, 1931.

old upwards but, beyond the more marked changes of bones and joints in older animals, there is a great similarity about the general findings. If, on the other hand, a general *post-mortem* is made of an animal destroyed on account of ringbone, sidebone, spavin or navicular disease, but with no sign of shivering, similar general changes are found, numerous joints other than the one clinically affected showing pathological change—sometimes so great that it is surprising that the animal has been able to go about showing no lameness on that particular leg.

At the same time similar microscopic changes are seen in the sciatic nerve, though usually not so marked as in a shiverer.

By using the clinical sign ' shivering ' as my indication of unsoundness I have been able to build up a pathological conception of the process of this general disease affecting the horse from two years of age upwards, but it is difficult to get younger animals for investigation, as it is not until horses reach two years old, and are then seen to be hopelessly affected, that owners are willing to dispose of them.

Clinical observation, however, helps to supply missing links in the early stages of the disease, though it is a framework requiring substantiation by *post-mortem*.

The age period between birth and two years old I will cover by a rapid survey of facts which many of you can no doubt corroborate from your clinical experience.

There are all gradations of disease, ranging from the weak foal which we recognise as dying from an acute septicæmia within 24 hours of birth, to the well-developed two year old which has never had any sign of illness from the time of birth and which on examination shows no sign of unsoundness. The intermediate types are (*a*) The delayed case of joint-ill which may linger on and eventually dies or is destroyed; (*b*) The foal which is not recognised as having suffered from joint-ill but which in a varying time, sometimes weeks, sometimes months, develops a hydrops condition of various joints or tendon sheaths, *e.g.* bog spavin or thoroughpin. Some of these cases apparently recover completely, but others remain with permanent distensions; (*c*) The undergrown yearling with a legacy of the receding stage which may, especially as the age of two years is approached, show various further clinical unsoundnesses of joints, bones, respiratory and nervous system.

Ante-natal Life.—About the ante-natal period of development of the foal very little is known, but that gross disease may be initiated *in utero* is not unlikely. Foals born weakly and unable to stand; foals born at full time but already dead; foals born prematurely, sometimes alive but often still-born, have all been suffering from ill health. By a gradual moving backwards we begin to be involved in the problem of sterility of mares.

This ante-natal period of development must be of supreme importance, but beyond perhaps recognising that severe febrile disturbances of the mother may lead to death of the fœtus we know very little.

General Nature of the Disease.

Considering the *post-mortem* appearance as a whole the outstanding feature of them all is that the changes seen are all in the nature of a reaction to some irritant carried by the blood stream, with consequent overgrowth of vascular connective tissue. It is as well to remember that bones and joints with their varying constituents, compact and spongy bone, periosteum, joint capsules, articular cartilage, with their specialised cells such as osteoclasts, osteoblasts, cartilage cells, synovial cells, are all connective tissue structures and the changes we see in bones and joints vary according to the particular cells which are affected by the irritant. Thus in the same bone one may see in one part rarefaction as a result of stimulation of osteoblasts, in another sclerosis from stimulation of osteoblasts, and in still another an exostosis following periosteal stimulation. The effect on joints depends upon the particular vascular area damaged; in some the synovial membrane may be the part affected by the irritant and the result is variable, a hydrops condition as in bog spavin is common in young animals, in others synovial villi hypertrophy and a shaggy congested membrane results. If the vascular attack on the joint occurs by way of the spongy bone underlying the articular cartilage, ulceration may follow or vascular ingrowths of osteoblasts may produce nodular elevations on the articular surface.

When special tissues such as nerves are considered, again there is a vascular overgrowth of the connective tissue of the part, namely, the endoneurium, which later produces definite fibrous tissue which contracts and many of the nerve fibres are obliterated and in their place we see in the bundles characteristic felted masses of fibrous tissue.

Without labouring the point further I think I can say that there is growing evidence for my belief that the majority of the physical unsoundnesses which affect the horse are the result of some blood-borne irritation which interferes with the nutrition of the tissues.

Etiology.

When I come to look for the source of what I have been careful to call the irritant which causes the vascular connective tissue overgrowth, I confess that I have very little positive evidence to place before you, but basing what I have to say upon clinical and pathological observation and the evidence of recent experimental work on diet in relation to disease, I trust you will find that it at least permits of some hope of escape from the broad pathway which leads to that dead end as far as disease is concerned—heredity.

I will limit my discussion of etiology to four heads—Heredity, Infection, Hygiene and Diet.

Heredity.—I need hardly say that there is widespread belief among all interested in the horse that heredity plays a most important part in the development of many unsoundnesses. This belief has led Government authorities in all parts of the world, at the instigation no doubt of those interested in the improvement of breeds of horses, to draft regulations, imposing restrictions upon horses used for breeding purposes which suffer from certain diseased conditions.

Here in Scotland under the Horse Breeding (Scotland) Regulations, 1921, made by the Department of Agriculture for Scotland, under the Horse Breeding Act, 1918, the following diseases or defects are prescribed as diseases or defects rendering a stallion unsuitable for service of mares, namely: (1) cataract, (2) roaring, (3) whistling, (4) ringbone (high and low), (5) sidebone, (6) bone spavin, (7) navicular disease, (8) shivering, (9) stringhalt, (10) defective genital organs. Now, of these ten conditions 2-9 I consider to be merely local manifestations of the general disease common to the horse. No. 1 is certainly a result of the nutrition of the lens suffering and this is derived from the vascular

network in the iris and ciliary body, so the probability is that investigation of this condition will permit of it also being included as a local manifestation of the general disease.

If all these conditions 1-9 are really hereditary and they are all merely local manifestations of a general disease, then all local manifestations of this general disease are hereditary, in which case the scope of these regulations is too limited. I need only mention bog spavin, splints, thoroughpin and grunting as a few local manifestations which are not prescribed, and yet these are good indications that if such an animal were subjected to a thorough *post-mortem* examination numerous hidden osteo-arthritic and other lesions would be found.

This brings me to the crux of what I have to say to-day.

Is the belief in the hereditary nature of the group of conditions prescribed in the Horse Breeding Act not a delusion, a delusion blinding all interested in the welfare of our breeds of horses to real progress in breeding and maintaining them in health?

I am fully aware of the evidence which breeder after breeder of Clydesdales can quote regarding the hereditary nature of many of the prescribed diseases, especially shivering, which on the face of it has been very difficult to disbelieve. Up to the present nobody has stressed the general nature of the disease process underlying the various conditions which have for long been recognised clinically and I hold that this understanding is the first step towards fathoming the cause.

The pathological picture in all the various conditions is one of inflammation, the tissues affected being irritated by some circulated toxin, using that term in its widest sense.

I feel that more progress is likely to be made in diminishing the wastage among horses by a search for some factor or factors, which are deleteriously interfering with the nutrition of the tissues and producing the clinical signs recognised as unsoundness.

Let me ask those who are sceptical about a solution of the problem being found along such lines to take a more hopeful view, by reminding them that all inheritance requires nurture for its development, and granted that there may be some predisposition towards disease in the germ cells which may be beyond our control, at least we are able, or should be able, with the acquisition of further knowledge, to control to some extent nurture.

This is the age of preventive medicine and just as we have seen the rescue of such diseases as tuberculosis and rickets from their hopeless position of being regarded as inherited diseases by the discovery of a factor acting from without, so I am hopeful of the group of diseases under consideration coming under control.

With this hope in view the first essential I think we ought to remember in the quest for the cause of this general disease is, that the inheritance starting in the fertilised ovum passes the first 11 months of its nurture within the mother, and it seems only reasonable to expect, where a pregnant mare is suffering from an active disease process apparently due to some circulating toxin, that the chances of the fœtus suffering in a similar way are considerable. Such disease is not hereditary but congenital. The fact that horses may be affected with general active disease though the only clinical sign may be a localised lameness, which we may associate with a ringbone or some other osteo-arthritic condition (and in some there may not even be lameness) means that to breed from such definitely affected animals is risky until we are able to counter the toxic factor which is likely to affect the fœtus *in utero*. When more is known of this toxic factor and how to prevent its further formation and thus lead to cessation of the disease process in the mother, then it will probably be found to be quite safe to breed from such animals and expect sound healthy progeny.

Infection.—The wider my experience of the life history of horses suffering from osteo-arthritis and allied conditions, the more I am impressed with the part infection plays in precipitating the primary development of clinically recognisable lesions. It has long been recognised that an attack of some transient fever such as influenza, strangles, or simple pharyngitis may be followed by the horse becoming a roarer. Further evidence of a parallel nature is the gradual development of lameness in the phalangeal region following a transient fever, the time of occurrence of which can often be roughly estimated by an abnormal transverse ridging of the hoof indicating circulatory disturbance at the time of the febrile attack.

Again the effect of a febrile attack is seen in the exacerbation of signs in a horse already affected with shivering.

Joint-ill is particularly interesting as it is the joint condition among all others in which one would have expected beneficial results to have followed vaccine or serological treatment, as pure cultures of organisms are readily found in acutely affected joints. I think very few have much faith to-day in vaccines or sera for the prevention or cure of joint-ill.

Is not the reason for their failure the likelihood that infection is only a secondary causal factor?

Apart from the active stages of joint-ill, I think I am right in saying that there is no evidence that the continuance of chronic joint or bone disease of a progressive nature is due to bacterial infection. Clinical evidence, however, certainly points to infection playing some part in the general disease process in many cases, but the place of this factor in etiology will be touched upon again when I deal with the effect of diet.

Local infections may be an occasional source of toxin which may play a part in the chronic disease process, but in spite of careful search in all my *post-mortem* work I have only come across one case of this nature, the local focus being chronic abscesses in the pharyngeal glands from which a pure culture of a streptococcus was obtained, so I think the factor is of little importance.

Hygiene.—The unhygienic stable, badly ventilated, lighted and paved, predisposes animals to excessive risk from transient fevers and therefore adds to the dangers of the early appearance of osteo-arthritic trouble. Though I am doing little more than mention this factor through the necessity for brevity, I have no desire to underestimate its importance.

Diet.—In a previous paper I discussed the possibilities of wrong diet being one of the basic factors causing the diverse diseased conditions met with in the horse, and came to the tentative conclusion that if avitaminosis was a cause then vitamins A and C were the most likely deficiencies in the horse fed largely, if not exclusively, on oats and hay.

In support of my suspicion I wish to bring to your notice some facts brought out by Colonel R. McCarrison in a lecture[2] based on experimental research at the Pasteur Institute, Coonoor, South India, delivered before the Royal College of Surgeons, England, recently.

He showed that disease and death had been excluded from an experimental stock of 1,000 stock albino rats from which he obtains 1,100 young rats per year for experimental purposes by minute attention to three environmental conditions—cleanliness, comfort and food.

During the last 2¼ years he had examined at *post-mortem* 2,243 rats fed improperly but otherwise kept under similar conditions to the stock rats, and found all manner of morbid conditions in the various systems of the body and not infrequently more than one disease present in the same animal. At the same time he failed to find disease in the stock rats.

The list of diseases is too long to quote here, but from his list I have picked out such disease conditions as adenoid growths, gastric ulcer, vesical calculus, enlarged lymph glands, polyneuritis, myocarditis, inflammation of the uterus, death of the fœtus *in utero*, premature birth, crooked spines, distorted vertebræ and imperfect teeth.

I will quote how he sums up the experiment: "Here, then, is an experiment on a large scale extending over a period of two and a quarter years. On the one side there is, as controls, a community of hygienically-housed rats, fed on a well-balanced diet composed of natural foodstuffs —whole wheat, pulses, raw milk, butter, fresh vegetables and fresh meat with fat and bones occasionally—so combined as to provide in proper amount and proportion all elements and complexes necessary for normal nutrition. On the other, there is a community of rats, also hygienically housed, but fed on ill-balanced diets composed mainly of cereal grains or cereal products and vegetable fats with little or no milk, butter and fresh vegetables. The contrast between these two communities is remarkable and I claim for this experiment that it proves conclusively that one-sided diets which are disproportionately rich in cereals and poor in animal fats, milk and fresh vegetables are capable of inducing in albino rats a large proportion of the diseases included in our calendar of human ailments. I may add that of all the faulty diets I have used, that composed of white bread, margarine, tea, sugar, jam, preserved meat, and scanty overcooked vegetables—a diet in common use by many people in this country—proved to be one of the worst, and most likely to be associated with many of the morbid states I have mentioned, especially diseases of the lungs and of the gastro-intestinal tract.

"Rats are not the only animals I use; guinea-pigs, rabbits, pigeons and monkeys are also employed. In every species I have found the same thing: properly fed animals remain remarkably free from disease, improperly fed animals are remarkably subject to it.

"It is reasonable, therefore, to assume that the human species is no exception to this rule, and that many of the ailments to which man is erroneously supposed to be heir are the outcome of his improper feeding. Some may hold that it is not possible directly to translate to human experience the results of an experiment such as that just described. This may be true, if we seek to do so too rigidly and fail to take sufficient count of other environmental factors to which human beings may be exposed. But, in general, the results of an experiment of this kind do, in my opinion, apply to man, and point the way to a solution of many etiological problems connected with his physical infirmities."

Most of the conditions enumerated by McCarrison occurred in animals whose ill-balanced diet contained little or no vitamin A-bearing food material, and the diversity of conditions depends upon the variation in the deficiency of this vitamin, ranging from a complete lack to a mere insufficiency.

Knowledge of the exact method by which vitamin A protects from disease is still incomplete.

One of the chief functions is said to be the maintenance of functional integrity of cells covering body surfaces, thus protecting the body against infections. Another function, according to Mellanby[3], is to counter a toxamin or harmful substance present in cereals, especially oatmeal, which in experimental dogs leads to severe inco-ordination followed by weakness of the hind legs due to this toxic substance acting on the nervous system.

If the conclusions of McCarrison's experiment hold for man, is there not reason to think they hold also for the horse?

The common diet of the horse, oats and hay, appears to be markedly deficient in vitamin A as this vitamin, though present in summer grass, is apparently easily oxidisable and disappears rapidly. The other constituent of the diet, oats, is the cereal which above all others contains the toxamin which causes degenerative changes in the nervous system in experimental dogs. Here, then, appears to be a diet admirably suited to produce disease. Is there any reason to suppose that it does so in the horse?

I have myself seen gross pathological changes affecting the alimentary canal, lymphatic system, nervous system, bones, joints and tendon sheaths; these I am certain about, and I suspect there are many other changes, especially microscopic ones, which I have not so far been able to appreciate, as my present difficulty is the determination of what is normal healthy structure and what is pathological. May not the transient fevers of the horse, many of which precipitate the appearance of clinical signs of unsoundness, be the result of weakening of the resisting power of cells covering the body surfaces, especially in the region of the pharynx, following vitamin A deficiency?

It is only fair to remind you that a multiplicity of morbid lesions can be experimentally produced in guinea-pigs on a diet containing an insufficiency of vitamin C, and the diet of the horse, in addition to being deficient in vitamin A, is generally deficient in this way.

As far as I can judge, the question of whether the horse suffers from an avitaminosis urgently calls for experimental investigation, in view of the restricted nature of its diet and the frequency with which unsoundness occurs, associated with widespread disease of the whole organism.

References.

[1]Mitchell. *Veterinary Record*, June 21st, 1930, p. 535.

[2]McCarrison, R. *British Med. Journ.*, June 6th, 1931, p. 966.

[3]Mellanby, M. Med. Research Council, Special Report Series, No. 140, 1929.

Discussion.

Mr. W. Hepburn thanked Professor Mitchell very sincerely for his paper which, he said, he would very much have liked to have had beforehand, so that he could have more fully studied the rather revolutionary statements contained therein. Although he could not agree with Professor Mitchell in all his theories, yet, on the whole, he was inclined to view them with great hope and interest. In particular, he could not agree with Professor Mitchell's views on "grunting." He had found very few horses which would not "grunt," but on putting them to a severe test he had found very few indeed which he could turn down. Mr. Hepburn also related some interesting cases of shivering.

Mr. J. Grant congratulated Professor Mitchell most heartily on breaking what he might readily term fresh ground. Professor Mitchell's ideas were certainly most stimulating. With regard to nutrition, he would point out that there was a very vast difference in the feeding of horses compared with the feeding of cattle in that the latter usually got much more fresh food than horses. In that way nutrition might support Professor Mitchell's theories. Mr. Grant, however, was of opinion that shivering was the weak link in Professor Mitchell's argument and he was inclined to the view that cases substantiated the conclusion that there is an hereditary factor present.

Mr. W. Macpherson instanced the case of one particular stallion in Aberdeenshire, the offspring of which in the great majority of cases developed stringhalt. That, to his mind, suggested that the disease wore an hereditary aspect.

Mr. R. E. Drennan agreed that there was a great deal in Professor Mitchell's theories, especially when one considered that Shetland ponies were practically always free from bone disease. He considered that that freeness from such disease was due to the natural conditions under which they lived.

Major H. McVean and Mr. W. J. Rice also expressed their pleasure and the latter, in particular, said that he considered there was much in what Professor Mitchell had put forward and he trusted that the results of his researches would bear fruit.

Mr. J. McAllan (Hon. Secretary) added his thanks to Professor Mitchell and also expressed the view that Professor Mitchell's outlook on arthritic conditions was a very original and at the same time a very hopeful one.

The Reply.

Professor Mitchell, in his reply, said that in putting this paper before the members he did not do so with the idea that his views were absolutely confirmed, but he had seen a sufficient number of cases of multiple arthritis to lead him to formulate the theory which he had put before them. He had not learned everything yet, but he was merely treading what was new ground and from his experience so far he was inclined to think that his views were in time likely to be substantiated when further proof was brought forward. At the same time, the proof of course was slow to find, especially in such conditions as shivering in younger animals. Dealing with the question of "grunting," as raised by Mr. Hepburn, Professor Mitchell's contention was that the very fact that degrees of "grunting" were recognised made him ask the question —where, in these various degrees, does one, and can one, draw the line?

In conclusion, Professor Mitchell said that he was exceedingly gratified at the discussion that had taken place and requested the members to do all they could to help him in his work, chiefly in the way of sending him animals or letting him know where animals showing arthritic conditions might be obtained.

Ten thousand wild horses on the San Carlos Indian Reservation, near Coolidge Dam, in Arizona, are to be either destroyed or shipped to rendering plants for slaughter, in an effort to eradicate dourine from the State, according to Dr. Edward L. Stam, State Veterinarian.

The Veterinary Record.

November 7th, 1931.

Etiology of Unsoundness of the Horse.

We publish this week an interesting paper by Professor Mitchell, which deals mainly with the etiology of unsoundness of the horse. He has advanced certain theories which, although not yet complete, have opened up a wide avenue for enquiry and thought. Perhaps the main theme of the paper is a protest against the general acquiescence in the hereditary nature of many of the conditions included under the heading of unsoundness. With this protest we would agree if it partook more of the nature of a warning that up to the present this view has not been clearly proved, in spite of much circumstantial evidence in its support. Many of us believe that there is, underlying those clinical developments to which the paper specifically refers, some constitutional element of either a general or local character which may predispose to the first visible sign or signs of the disease, but whether that peculiarity is inherited or acquired by injudicious management in the way of bad hygienic surroundings, improper feeding or working conditions, or a combination of all these factors, will be very difficult to determine. *Post-mortem* examination alone will not help very much in assessing any degree of susceptibility that may be transmitted from sire or dam to offspring. Here a reliable statistical survey of clinical observations and experience would be invaluable and might be decisive. At present the principle of heredity appears firmly established as playing some part in many well-known unsoundnesses. No one will deny the importance of conformation and balance of power in preserving soundness and if breeders are indifferent to this particular aspect of parental selection, they will assuredly find that when their youngsters are put to work any weaknesses that may be transmitted will be discovered.

The contention that an unsatisfactory diet may predispose to unsoundness may simply be part of the general belief, nowadays substantiated by both clinical and experimental observations, that any debilitating factor will predispose to the development of subsequent disease. It is of course well-known that many systemic ailments of the horse are frequently followed by such conditions of unsoundness as blindness, shivering, roaring, emphysema, arthritis, periostitis, coronitis, laminitis and many other conditions.

It is possible, too, that many of these unsoundnesses are merely symptoms of some deeper underlying cause, which need not necessarily be the same in all cases. Perhaps in some an irritant may be responsible, as Professor Mitchell suggests in part of his paper, but this does not appear

likely from our present knowledge. It is more probable that dietetic factors are directly involved apart from any irritant or poisoning effect. Recent research work upon nutrition has emphasised the importance of the interdependence of various constituents of the diet, and especially important appear to be the salts and vitamins in this connection. The interdependence of calcium, phosphorus and vitamin D has been amply illustrated in bone formation and disease whilst an excess of the vitamin may even lead to mineral deposits being formed in various tissues. Relationships between other vitamins and various tissues have also been demonstrated, *e.g.* vitamin A and mucous membranes (including that of the eye), vitamin B and probably nervous tissues, etc. It is by no means fantastic to suggest that the standard diet of the horse may prove to be deficient or unbalanced with respect to certain factors essential for the soundness of the animal.

The only way to solve satisfactorily the problems of unsoundness would necessitate lengthy and patient research upon a sufficiently large number of suitable animals, the problem being investigated from many different angles including those of heredity, nutrition and infection. Unfortunately at the present time there appears to be little prospect of the materialisation of the financial aid necessary to conduct such an enquiry. Meanwhile, such work as that undertaken by Professor Mitchell may considerably widen and benefit our knowledge of unsoundness in the horse.

Horses for Town Transport.

"For town work, *i.e.*, carting from mill to mill and mill to station, we find horse transport far more economical than motor . . . . The day of the horse is not yet by any means over." This statement has been made to the National Horse Association by the British Oil and Cake Mills, Hull.

Further evidence of the value of the horse comes from Mr. J. S. Holloway, transport manager of the Leeds Industrial Co-operative Society, who states that in comparing horse with mechanical traction perhaps the most important factor is the proportion of the standing time as against that occupied in running the vehicle. After quoting figures, he states that they show most conclusively that for town delivery the horse has a function to perform, and the substitution of mechanical haulage will not result in more efficient service, but will make for greater cost.—*Farmer and Stock-breeder.*

The Tail-Waggers' Club, the dog membership of which now approximates 500,000, and which has already raised £20,000 for dog charities, has recently made the following further donations:—Glasgow Veterinary College, £500; Bristol Dogs' Home, £100; Plymouth Dogs' Home, £50; Royal Veterinary College, £25; Our Dumb Friends' League, £25.

South Herefordshire Hunt Poultry Fund Committee states that poultry claims during the last four years have amounted to over £600, and since May of this year sums paid out in respect of such claims have totalled £102.

Royal College of Veterinary Surgeons.

Special Meeting of Council.

At a Special Meeting of Council held at the College, 10, Red Lion Square, London, W.C.1, on Thursday, October, 22nd, 1931, there were present Mr. G. P. Male (President) in the chair, Professor J. B. Buxton, Major G. W. Dunkin, Professor F. T. G. Hobday, Messrs. J. Holroyd, G. H. Livesey, Sir John M'Fadyean, Mr. J. W. McIntosh, Dr. J. Share-Jones, Dr. A. Leslie Sheather, Professor G. H. Wooldridge, Captain W. G. Wragg and Lieut.-Colonel T. Dunlop Young.

The minutes of the previous meeting were read and signed as correct.

Letters of apology for absence were received from Dr. O. Charnock Bradley, Captain J. C. Coleman, Professor S. H. Gaiger, Messrs. R. Hughes, W. Nairn, Major D. S. Rabagliati, Lieut.-Colonel P. J. Simpson, Captain R. Simpson, Mr. Trevor F. Spencer, Major A. Spreull, Colonel G. K. Walker and Dr. A. W. Whitehouse.

Bye-Laws.

It was resolved That the following alterations to Bye-laws adopted at the previous Special Meeting be confirmed:—

(*a*) Bye-law 66. The examination for the Diploma of Membership shall be held in each city in which there is situate an affiliated Veterinary School, once during each year, namely, in July. Any additional examination or examinations shall be held at such centre or centres as the Council shall from time to time decide. The Council shall, at the Quarterly Meeting held in July in each year, fix the dates of the Membership Examinations to be held in the following July, and at the Quarterly Meeting held in October, the time and place or places at which any additional examination or examinations shall be held.

(*b*) Bye-law 77. Students obtaining pass marks in all but one of the subjects of an examination group, may be exempted from further examination in the subject or subjects in which they have passed and be allowed to proceed to the next year's course of study conditionally on their passing in the required subject at a subsequent examination, prior to presenting themselves for examination in the next year's examination group. (With effect as from July 1st, 1931).

The Seal of the College was ordered to be attached to the Bye-laws as amended.

Statistics just issued by the Isle of Man Government show that the number of horses in the Island is now 3,417 (a decrease of 211); cattle, 19,477 (decrease, 469); sheep, 91,153 (decrease, 5,305); pigs, 4,172 (increase, 542); poultry, 157,516 (increase, 6,499).

"No wonder our dairy farmers are drowned in surplus milk. In the first nine months of this year we imported 2,380,657 cwt. of condensed milk and milk powder against 2,163,018 cwt. in the first nine months of 1930. Holland, our principal supplier, sent 1,690,369 cwt., and the United States came next with 194,237 cwt.—increases of 143,763 cwt. and 106,380 cwt. respectively compared with last year."—*Scottish Farmer.*

Clinical and Case Reports.

An Interesting Case of Inguinal Hernia in the Bitch.

By
J. G. Wright.
J. H. N. Hobday.
Royal Veterinary College.

Subject :—A five-year-old black Chow bitch, multipara. The animal had a litter of four puppies when 15 months old, the period of gestation and parturition being normal.

About nine weeks prior to examination the bitch was " accidentally " mated, and shortly after this a swelling was noticed in the inguinal region. It became progressively larger during gestation. The bitch was in normal health and there were no signs of approaching parturition other than the onset of lactation.

Examination revealed a pendulous swelling in the left inguinal region the size of a cocoanut, and manipulation of this disclosed the presence in it of two fœtuses. Abdominal palpation did not reveal any others.

Diagnosis :—The case one of inguinal hernia, the contents of which comprised one or both gravid horns of the uterus.

In view of the fact that parturition had not commenced and that the cervix uteri was still intact, it was decided to perform cæsarian section after exposing the uterus through the hernia, and then completing the radical operation for inguinal hernia.

Operation :—No food was given on the day of operation, and preliminary narcosis was effected by the subcutaneous injection of morphine sulphate gr.ii. Inhalation anæsthesia with chloroform (B.D.H.) was adopted, using the Hobday apparatus, air over chloroform. (Miss Ford, student, acted as anæsthetist.)

The site was prepared by shaving, cleansing with surgical spirit, and finally painting with Tr. Iodi. Mitis. The operation area was surrounded by sterile cloths, held in position by towel clips.

Exposure of the hernial sac :—An incision was made, well to the side of the nipple of the left inguinal mammary gland, three inches long and parallel to the long axis of the body, through the skin and the subcutaneous areolar tissue, down to the peritoneum forming the hernial sac. (See Figure 1.)

Rapidly by blunt dissection with the fingers, the whole of the sac down to the external ring was exposed. This necessitated reflecting the left inguinal mammary gland.

The peritoneum was next incised for a length of three inches (its edges were clipped by artery forceps to facilitate identification later in the operation) and the herniated organ drawn out of the sac. This comprised the uterine body, the horns, together with parts of the broad ligaments. (See Figure 2.)

Each horn was gravid with one fœtus.

Cæsarean Section :—The uterus was reflected backwards and laid upon warm sterile wool. An incision 1½ inches long was made into the dorsal surface of the body, parallel to its long axis, immediately behind the bifurcation, and a fœtus with fœtal membranes was removed from each horn. (See Figure 3.)

The fœtuses were dead and commencing to undergo sterile degenerative changes. (There was no liquor amnii and the amnion was not recognisable. Separation of the chorion had taken place, and the green allantoic fluid was free in the uterine horns. One of us—J.G.W.—has previously met a similar condition in a Chow bitch, in which case cæsarean section was performed 74 days after conception, but in which parturition had not commenced. In the case under review we cannot ascertain the exact period of gestation. The owner states that—" he only knows she's due." We suspect the bitch to be considerably overdue.)

The interior of each horn was mopped with sterile wool. Closure of the uterine wound was effected by :—

(*a*) A continuous suture—No. 1 silk—including all coats.

(*b*) A layer of interrupted Lembert sutures—No. 1 silk. (See Figure 4.)

By the time this was completed involution of the uterus was already commencing.

Occlusion of the hernial sac :—The edges of the hernial sac were now drawn up around the uterus and by gently twisting the stalk this organ was easily returned, through the inguinal ring, into the abdomen. (See Figure 5.)

Recurrence of the hernia was prevented by obliterating the hernial sac. The stalk was ligated, close to the external inguinal ring, with a transfixing silk ligature, and the remainder cut off.

No attempt was made to suture the inguinal ring. It is our experience that such a procedure is unnecessary, and that obliteration of the hernial sac effectively prevents a recurrence. Attempts to occlude the ring, have, in our opinion, the following disadvantages :—

1. Not infrequently one ruptures the peritoneum adherent to the external ring, and an omental hernia may occur through this rupture.

2. There is a danger of perforating with the needle one of the large veins which traverse this area. This may give rise to serious hæmorrhage and even hæmatoma formation, whereas the operation as described is almost bloodless.

3. Whilst the anterior border of the ring is easily recognised and can be picked up with the forceps, the posterior border cannot be, and thus necessitates blind jabbing with the needle.

Completion of the operation comprises a layer of three or four interrupted sutures (No. 1 silk) connecting up the areolar tissue on either side of the incision : this serves to replace the mammary gland and also eliminate dead space ; and finally the skin wound is closed with interrupted sutures (No. 4 silk).

After treatment :—The bitch in question was of a vicious nature, and so the wound was not examined until the ninth day, when morphine sulph. (gr.ii) was again given. It was found that the wound had healed by first intention and so the skin sutures were removed. (See Figure 6.)

Recovery was uneventful.

Photographs 1-5 were taken by Mr. P. J. Southon and No. 6 by Mr. J. W. H. Holmes, to whom we wish to express our thanks.

Cornwall Public Health Committee, at a recent meeting, gave support to a resolution from the Pembrokeshire County Council urging a reduction in fees for licences to sell graded milk. It was stated that comparatively few licences were taken out in Cornwall, and that, although many farmers were producing Grade A milk, they were not selling it as such.

FIG. 1.—THE SITE PREPARED FOR OPERATION, SHOWING THE HERNIA AND (DOTTED LINE) THE APPROXIMATE POSITION OF THE INCISION.

FIG. 2.—THE HERNIATED GRAVID UTERUS.

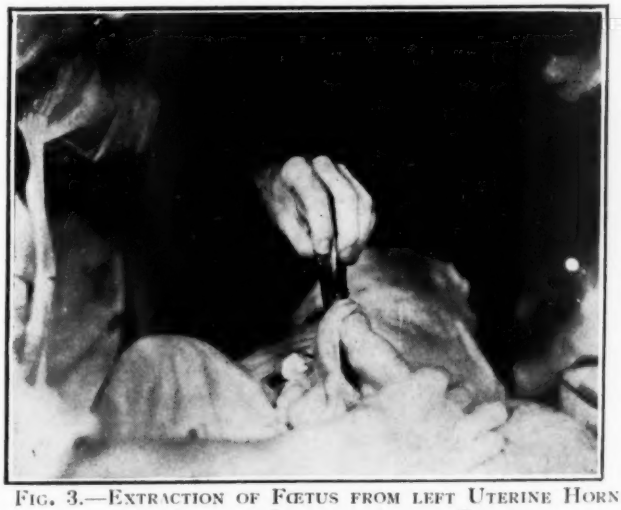

FIG. 3.—EXTRACTION OF FŒTUS FROM LEFT UTERINE HORN THROUGH THE INCISION IN THE BODY.

FIG. 4.—CLOSURE OF THE UTERINE WOUND. THE ORGAN IS HELD BY BOWEL FORCEPS, WHILST A CONTINUOUS SUTURE IS BEING INSERTED TO DRAW THE EDGES OF THE INCISION TOGETHER.

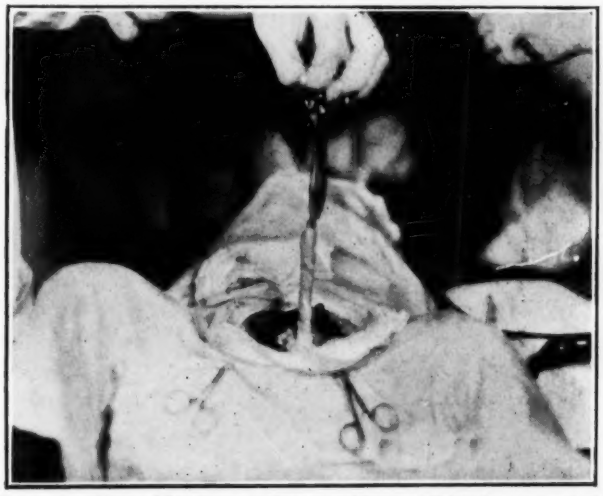

FIG. 5.—THE UTERUS HAVING BEEN RETURNED TO THE ABDOMEN THROUGH THE INGUINAL CANAL, THE HERNIAL SAC IS TWISTED TO A PEDICLE AND LIGATED AT ITS BASE.

FIG. 6.—THE WOUND ON THE NINTH DAY AFTER OPERATION.

Healing Wounds with Maggots.

Alex. H. Gentle, M.R.C.V.S., Otley.

In *The Literary Digest*, an American journal, I have just read an article with the above heading, which recalls to my mind a case I had when I was Acting Veterinary Surgeon in the Cape Mounted Riflemen at Umtala in 1881-82. Among the sports to celebrate the Queen's Birthday, in the latter year, was "Cutting the Lemon" which had a good entry. One of the competitors, in making the cut, caught his mount at the base of the ear, nearly severing it—there would be no more left at each side than a quarter of an inch.

I cast the horse, dressed and stitched the wound. There was no stable available, the horses being tied up at night in the Fort, and flies were very numerous. The wound did well, so that I left dressings and instructions with the owner (all the horses were the property of the men) and only visited the case occasionally.

One morning I was amazed to find the wound full of maggots, the result of not having been dressed for 24 hours, and I wondered if the ear would drop off. A strong solution of carbolic soon disposed of the maggots, and to my surprise the wound looked beautifully clean and healthy; it went on well and eventually made a perfect union.

I see from the article that maggots only attack "putrefying substances and never touch the parts which are endowed with life."

Abstracts.

Epidemic Rabies in Man.

[**An Outbreak of Rabies in Trinidad without History of Bites, and with the Symptoms of Acute Ascending Myelitis.*** Hurst, E., Weston, and Powan, J. L. *The Lancet*, Vol. ccxxi, No. 5638; Vol. II, No. xii, pp. 622-8, September 19th, 1931.]

This important contribution to the clinical study of rabies opens with the reminder that records of the disease date back to the fifth century B.C. and that from the time of Aristotle onwards the human disease has always been associated with the bite of a rabid animal—a fact which lends great significance to the outbreak in Trinidad the authors now describe, as being the first in which no history of bites can be elicited. Moreover, no other mode of transmission has as yet been determined. A further unprecedented feature is that the epidemic under notice consisted solely of cases of the paralytic type.

* In our issue of October 3rd, 1931 (Vol. xi, No. 40, p. 1018), we published under the heading "Vampire Bats and a New Disease," a brief message from the Port of Spain correspondent of *The Times*, who used it in reporting this outbreak while conveying a suggestion of its association with rabies.

The epidemic, which presented the clinical features of acute ascending myelitis, broke out in the island of Trinidad in 1929, seventeen natives, including members both of the East Indian and of the Negro races, being affected. Early recognition of any association with the virus of rabies was militated against not only by the absence of history of bites, but by the fact that no case of rabies has been recognised in the island since 1914. Quarantine laws are of the strictest and, except for animals coming from the United Kingdom, no dog can enter without a quarantine of at least six months and inspection and certification by the Government Veterinary Surgeon.

Until experimental investigations were made, therefore, the prevalent opinion amongst medical practitioners was that the outbreak was probably one of acute poliomyelitis, colour being lent to this supposition by the fact that in the earlier cases no sensory changes were detected.

All 17 cases ended fatally, but in one case only did spasmodic difficulty in swallowing during the later stages suggest to the doctor in attendance that the case "looked like one of hydrophobia."

Examination of the blood and urine was always negative; no malarial parasite was found. The pathological changes in the spinal cord were characteristic of rabies, though no Negri bodies were discovered.

Experimental Investigation.

The disease proved transmissible to animals, which exhibited both the symptoms of rabies and the characteristic pathological changes of this disease, including the presence of Negri bodies. Pieces of spinal cord from the first case and a number of regions of the central nervous system from case two were placed in sterile glycerin and forwarded to the Lister Institute. Parieto-occipital lobe inoculation of four monkeys with doses of 1 or 2 c.cm. of a 10 per cent. emulsion of the spinal cord of the first case, in sterile saline, produced, after inoculation periods of 15, 17, 17 and 42 days respectively, rather curious symptoms—less characteristic of rabies than those observed later in passage animals. Peculiarly piercing shrieks, quite unlike the normal cry of a monkey, were, however, evinced by one monkey, and all squealed continually, but on interference made no attempt to bite and no muscular spasms occurred. In animals inoculated from these, the symptoms were typical of rabies and very similar to those in a monkey infected with *virus fixe*. After a short period, in which the animal was actively aggressive, and in one case killed its cage mate, violent muscular spasms (occasionally sufficient to throw the animal bodily across the cage) occurred and gradually passed into a stage of general weakness ending in death.

The Disease of Cattle.

A similar virus had been isolated from cattle in Trinidad in animals suffering from a disease which, making its appearance in July, 1925, was diagnosed as botulism. In that year there were 46 deaths among various herds, totalling approximately 450 head, in and around Queen's Park, Savannah (Port of Spain). Outbreaks of the disease have since appeared throughout the island; it was accepted as botulism by local veterinary surgeons thoroughly acquainted with the condition as seen in the United States and Canada, and certainty was generated when, in two

instances, one of the authors (Dr. Powan), isolated the *Bacillus botulinus* from the liver and spleen, and the organism was found in samples of soil and water from "infected" pastures. The main symptoms consisted in constipation, grinding of the teeth, salivation, tremor and involuntary movements, muscular inco-ordination and finally prostration, respiratory failure and death.

[*Note by G. W. D.*: "Some of the symptoms seen in the affected cattle and described by the author are reminiscent of Aujeszky's disease or paralysis bulbaris infectiosa, which was first described in 1902. *Aujeszky enumerated the symptoms of this condition which he also described as pseudo-rabies as seen in cattle. The incubation lasts from 28-32 hours and exceptionally up to five days. There is alteration in character, loss of liveliness, restless wandering, and lowing and moaning. Appetite is impaired and thirst is increased. Breathing becomes difficult and there is a steady flow of saliva. At times there may be excitement; the genuine biting urge and raving madness was not observed. In the latter stage of the disease there was twitching of the muscles, tonic-clonic spasms and then paralysis. According to Zwick, natural infection is apparently oral.]

There appeared to be no epidemiological connection, however, between the human and bovine disease, for despite the fact that the owners of cattle among the labouring classes tend their animals with every care, only three of the 17 cases occurred in East Indians, who chiefly own them. Nevertheless, from the brain of a cow suffering from so-called botulism the authors obtained a virus similar to that from the human cases, while in the cornu ammonis of a second cow typical Negri bodies were detected. "It appears, consequently, either that botulism and rabies exist side by side and are clinically indistinguishable, or, more likely, that the cattle disease is rabies, and the finding of *B. botulinus* a chance occurrence unconnected with the real cause of death. Further investigation of this problem is proceeding, as are cross-immunity tests with the cattle virus and the *virus fixe*."

No direct mode of transmission from the cattle to the individuals affected has been discovered, nor was there evidence that they had been bitten by dogs.

Paralytical Rabies as a Clinical Entity.

The question of paralytical rabies—normal in herbivora and rodents, but numbered among the less usual clinical manifestations of rabic infection in man—is discussed. "It is commonly held that such cases in man are more apt to arise after extensive bites—*e.g.*, by rabid wolves—where the infecting dose of virus is presumably very large." Remlinger (1906) is quoted as accepting rabies as a cause of Landry paralysis, which has sometimes, during life, been diagnosed as poliomyelitis; Koch (1912) described a case of ascending paralysis accompanied by anæsthesia but without hydrophobia and coming on during antirabic treatment—he believed that the rabic virus was responsible for the paralysis—but no previous author has described a series of 17 consecutive cases all of the paralytic variety, and unattended by any examples of the classical disease.

*Aujeszky. "Uber eine neue Infectionskrankheit für Haustiere," *Zentralbl. f. Bact. Parasitenk. u. Infectionskrankh.* Abt. 1, orig. Bd. 32, S.353, 1902.

The Trinidad Disease and the Possible Vector.

For a variety of reasons the cases described in this paper are of especial interest; all were of the paralytic type, and in the absence of detectable evidence of sensory changes the earlier cases were accepted as examples of the Landry syndrome; thus, "it seems desirable that cases with this diagnosis, in countries where rabies is common, and even in those apparently free from the malady, should be investigated experimentally." The cause for the unusual clinical features is difficult to envisage; if bites there were, they could not have been deep or extensive, as is usual in paralytic rabies in man. Moreover, the experimental results do not suggest that the Trinidad virus is either more or less virulent than the average street virus. Evidence of the plurality of rabic virus is wanting, but consideration must be given to the possibility of a modification of the virus. There is no indication that rabies takes an unusual form in races other than the European, and, finally, individual predisposition can hardly be a factor in each of 17 cases.

Examples of the modification of the symptomatology of rabies in animals are given, and, in discussing the findings of Kabayashi (1925) in the study of the Japanese encephalitis epidemic of 1924, the authors say "If they could be accepted unreservedly, they would indicate the ability of the rabic virus to give rise to a clinical condition differing widely from the classical hydrophobia." Some uncertainty exists, however, whether the virus originated from the human material or not.

No definite information is available concerning the transmission of the disease in Trinidad; the epidemiological evidence indicates that the human affection as a whole is not directly connected with the cattle disease—*e.g.*, the possibility of inducing rabies by feeding with the milk of rabid animals is not accepted. A common vector of the two outbreaks is feasible, however, from analogy with rabies elsewhere. The biting of cattle by a rabid animal, especially if small and less obtrusive than a mad dog, might easily pass unnoticed, and the possibility that 17 human beings might be bitten without their knowledge is not to be ignored. Brazilian cattle bitten by the vampire bat (*Phyllostoma superciliatum*, Burmeister) afterwards developed rabies (Haupt and Rehaag); a bat may bite a person during his sleep without his being aware of the occurrence, and the toe is a common site for the trauma: "we might thus account alike for the absence of history of bite and for the frequency, as the initial symptoms, of paræsthesiæ in the foot."

The clue to the origin of the Trinidad outbreak may be here, we are told, and investigation along this line is proceeding.

Summary.

An outbreak of human rabies, which in each of 17 cases took the paralytic form is described; in no instance is a history of bite by a rabid animal forthcoming.

The simultaneous occurrence of rabies in cattle is reported.

Epidemiological evidence does not suggest a direct connection between the human and the cattle disease.

The opinion that the vector in both cases may be the vampire bat is tentatively expressed.

W. B.

[**Our Knowledge of the Methods of Egg Concentration and Larva Culture from experience with the Strongyles of the Horse.** Staff Veterinary Dr. H. Fehtkötter. *Zeitschrift für Veterinärkunde.* July, 1930.]

In cases where sexually mature strongyles are present in the bowel of the horse the following methods of demonstration are in general use:—

1.—The microscopical examinations for eggs without the assistance of egg concentration methods.

2.—Investigations employing such methods.

3.—Culture and production of larvæ.

Egg concentration methods are of use when the presence of worms causes no symptoms. Differentiation between eggs and between larvæ of different varieties is so difficult as to be almost impossible.

In this instance it was desired to ascertain the degree of worm infestation as shown by the proportion of eggs necessary in order to cause macroscopic larval migration.

A fæcal ball was beaten up with a 10 per cent. solution of formalin in a tall, wide-mouthed flask of 200-300 c.c. capacity so that the fæces were about 10 cm. deep. With a glass tube 4 c.c. of the mixture were taken and placed in a centrifuge. The figures arrived at were only relative and not absolute, since the consistence of different samples of fæces varied.

Concentration solutions used were common salt and glycerine. After spinning, five drops were taken from each sample on a glass rod and examined.

Out of ten samples more eggs were found in fresh than in stale preparations in eight cases. Glycerine showed larger numbers than salt in eight cases. Larvæ were demonstrated in the seven cases where at least 83 eggs appeared in the five drops examined.

H. H.

[**Metastatic Strangles Abscesses in a Riding Horse.** Staff Veterinary A. Freude. *Zeitschrift für Veterinärkunde*, July, 1930.]

A recently purchased riding horse showed symptoms of giddiness and staggering, followed in a few days by death.

Post-mortem examination showed enlarged spleen; parenchymatous hepatitis; several encapsuled abscesses in the paravenal tissue on each side of the aorta, the capsule being 2 to 3 mm. thick; encapsuled abscesses the size of walnuts in the psoas muscles; degeneration of the aortic intima in the region of the anterior mesenteric artery; an abscess in the left lung the size of a hen's egg, with smaller ones near it, the lung tissue in the vicinity being solidified and adherent to the diaphragm; parenchymatous myocarditis, but no valve lesions; suppurative pachymeningitis, together with a large number of abscesses throughout the structures of the cerebral and cerebellar cavities.

Strangles streptococci were demonstrated in the pus.

H. H.

The number of dog licences issuel in England in 1930 was 2,647,565. Scotland had 171,837, and Wales 150,925, making a total of 2,997,327 for Great Britain.

Review.

[**Chirurgische Diagnostik des Pferdes (Surgical Diagnosis in the Horse).** Wittman, Dr. Fritz, Extra-ordinary Professor in the Surgical Clinic of Berlin Veterinary College. Published by Ferdinand Enke, Stuttgart. 1931. 217 pages with 44 figures. Price RM. 12·50 bound.]

This book, modelled on a former one of similar title by Professor Fröhner, is a compendium of surgical diagnosis of the horse alone and is designed to meet the needs of final term students and practitioners, who have already received a grounding in the subject.

The whole book is arranged to a plan of methodical examination—*e.g.*, inspection, percussion and so on—and for each region of the body the disease conditions encountered by these methods are merely mentioned by name. This arrangement is very useful for reference purposes when one has to make a differential diagnosis.

Almost one-quarter of the book is devoted to the examination of the eye and this part contains somewhat detailed information on this organ. About the same amount of matter deals with examinations for lameness and this section forms a useful complement to the section on lameness in Möller's "Klinische Diagnostik der äusseren Krankheiten der Haustiere" (published Enke), in which the subject is dealt with regionally.

The whole book is quite up-to-date, containing information on the use of such methods as X-rays, extradural anæsthesia, etc., but it is noticed that the technique of local anæsthetic injections into synovial cavities for the diagnosis of lameness after Forssell of Stockholm is only referred to in a few lines, and the use of toe and heel wedges for the aggravation of certain types of lameness is only described for the standing horse and nothing is said about their use for horses in motion.

The figures contained in the book are fairly plentiful and very helpful and excellently produced, as also is the printing.

J. T. E.

Reports.

Statistical and General Report, Army Veterinary Services, 1930-31.

Great Britain and Northern Ireland.

The average strength of the Army in Great Britain and Northern Ireland in animals during the year 1930-31 was 13,378 horses and 492 mules. Of this number 1,593, or 12 per cent., were remounts purchased during the year.

The average daily number sick was 708·28, or 5·29 per cent. horses and 9·61, or 1·95 per cent. mules. The average length of time sick was 18·11 days for horses and 21·78 days for mules. Wastage for veterinary reasons was 6·27 per cent. horses, and 1·62 per cent. mules. The average age of horses in the Army was 10·78 years, and of mules 12·87 years. The average age of casting for disease was 12·19 years in horses and 14·85 years in mules, that of casting for other causes was 15·68 years in horses, and 16·86 years in mules.

General improvement in the condition of animals was shown during the year, which is attributed to the great interest evinced by formations and units in horse-mastership, to the co-operation between units and the executive veterinary service, and to the treatment adopted for worm infestation in remounts and debilitated animals.

Of the various groups of diseases, fever simple claimed 685 cases, debility 173, respiratory disease 1,239, digestive disease 2,827, of which 2,002 were worm infestation; admissions for skin disease amounted to 801, of which only four were parasitic mange; surgical conditions accounted for 1,421 cases, and there were 6,407 cases of injury, ten horses having died as a result of a fire at Shoeburyness. Of specific disease 373 cases were admitted for treatment, 262 being for strangles and 100 for influenza.

Egypt.

In Egypt the average strength of animals was 1,822 horses and 816 mules. The average number daily under treatment was 6·31 per cent. horses and 4·27 per cent. mules. The average period of time each case was under treatment was 25·48 days for horses and 22·45 days for mules. Wastage for veterinary reasons was 5·42 per cent. horses and 3·54 per cent. mules. The average age of casting in the case of horses was 12·85 years for veterinary reasons and 16·51 years for other causes, and in the case of mules 17·73 years for veterinary reasons and 18·33 years for other causes.

The condition of animals in Egypt is better than last year, the improvement being attributable to treatment for worm infestation. The internal administration of ol. chenopodii has been found of benefit for the treatment of bursattæ and indolent sores common during the summer months, and spleen extract has been found efficacious in a bad case of canker. Close attention is being paid to matters of dietetics and in the training of soldiers in animal management and veterinary first aid.

R.A.V.C. Aldershot.

The Report includes the Annual Report of the Royal Army Veterinary School, Aldershot. Five courses of instruction were held during the year, *viz.*, one for officers, R.A.V.C., on probation, two for officers of combatant services in animal management (one month each) and two for N.C.O.'s in animal management (six weeks each). Thirty-nine officers and 38 N.C.O.'s passed.

Of vaccines, etc., manufactured, the following were issued: Stock catarrh vaccine, 1,312 doses; autogenous vaccines, 84 doses; stock pustular dermatitis vaccine, 128 doses; and spleen extract, 50 c.cs. Two hundred and twenty-four doses of anti-tetanic serum and 17 doses of tuberculin were also issued. A large quantity of stock catarrh vaccine is being used for all remounts joining units in the Aldershot Command and an estimate of its efficacy is being based on reduction in incidence and on the curtailment of number of days under treatment when employed.

Of mallein manufactured, 2,857 doses of the subcutaneous and 5,755 doses of the I.D.P. were issued during the year.

Laboratory Investigations and Radiography.

At the request of the Deputy Director of Veterinary Services, Aldershot Command, an enquiry was carried out into the etiology of an outbreak of equine influenza. No bacteria such as streptococci or "bacillus X," which some observers consider play a causal rôle in the disease, were present in the blood of affected animals and the findings were more reconcilable to the views of those who regard the disease as due to a filtrable virus. Efforts to transmit the disease by intravenous injection into experimental horses with blood of affected animals were successful in some cases and unsuccessful in others. The explanation of this probably lies in the fact that a proportion of army horses have acquired immunity through a previous attack whilst others are not so protected. This offers an explanation of the peculiar manner in which some horses in a troop stable contract the disease whilst others which are exposed equally to the risk of infection, escape.

An enquiry into a nervous condition clinically resembling Enzootic Spinal Paralysis (*vide* Hutyra and Marek, Vol. III, pages 420 *et seq.*, is in progress. Up to the present time five cases have occurred. Laboratory examinations have shown corpuscular wastage and replacement with immature red cells, but has not confirmed *Streptococcus melogenes* as the causal agent.

Radiography.

The new X-ray tube and mobile tube box supplied by the Research Department, Royal Arsenal, Woolwich, was brought into use on July 18th, 1930.

The expenditure incurred in its construction, £188 5s. 10d., has been justified. With the old installation, radiography of the horse's limbs was a slow and unsatisfactory process on account of the extreme difficulty of bringing the animal sufficiently close to the apparatus. With the newly designed installation it has been found to be a comparatively rapid and standardised procedure, as animals which could with great difficulty be made to approach the X-ray tube box, will stand sufficiently immobile whilst the portable instrument is brought close up to them: with the increased efficiency of the installation and improving technique permissible by its use there has been a great increase in the requests for X-ray examination of obscure cases of disease and a big impetus has been given to experimental examination. In a large number of cases it has been possible to check the results shown by skiagrams with the results shown on *post-mortem* examination and conclusive proof has been forthcoming that, in the employment of X-rays, a valuable aid has been provided for the diagnosis of diseases of the navicular region.

The number of cases submitted for X-ray enquiry into the cause of lameness between July 18th, 1930, and March 31st, 1931, was 40, requiring 78 exposures. A further 64 exposures have been made with cadavers with a view to obtaining needful information regarding technique. Compared with former years, this shows a very great advance. The recent advance in the employment of this method of aiding clinical diagnosis has shown that the demonstration of metallic foreign bodies is comparatively simple—foreign matter of vegetable origin, *e.g.*, thorns, etc., are difficult to demonstrate. Unquestionable evidence of fractures has been given in support of clinical diagnosis which fell short of finality, but the major portion of the work, diagnostic and experimental, has been directed towards the examination of the navicular region and the results obtained may be summarised as follows:—

(*a*) The demonstration of caries of the navicular bone is inconclusive—shadows caused by the condition being indefinite and not reliable for diagnosis.

(*b*) The examination of cases of navicular disease has, however, shown that caries alone is a comparatively rare feature of the disease which has been found to be associated in the vast majority of cases with :—

(1) Disproportion of the relative width and length of the navicular bone amounting to deformity.

(2) The presence of a definite ostitis of the navicular bone causing the deposition of osteophytes on the periphery, especially noticeable at the two extremities of the bone where this bony deposit gives the appearance of a bony process or spur projecting in an upward direction.

(3) The formation of an osseous strand or bridge which appears to connect the wing of the navicular bone to the inner surface of the os pedis. It is possible that features 2 and 3 are the same, the apparent difference being due to the direction taken by the new growth.

With the demonstration of features 1, 2 and 3, a diagnosis of navicular disease has been preferred and such diagnosis has almost invariably been confirmed on *post-mortem* examination. Caries of the navicular bone unassociated with other changes has so far failed to yield conclusive evidence by means of X-rays.

The employment of X-rays in the examination of the navicular region of the horse's foot has so far failed to demonstrate the existence of a true pedal ostitis; bony deposits in the plantar region of the os pedis have never been shown—the only bony changes so far observed are those involving the wing of the os pedis at its junction with the lateral cartilage and are referable to the condition commonly known as " incipient sidebone."

J. M.

City of Sheffield Veterinary Department.

The Chief Veterinary Officer of Sheffield is to be congratulated upon his Annual Report for the year 1930, this being Mr. Tweed's year in office following his appointment after the retirement of Mr. J. S. Lloyd, F.R.C.V.S., D.V.S.M.

In this report there is a wealth of detail, especially as regards statistics in connection with the animal population of the City, and in the examination both *ante-* and *post-mortem* these averages are worked out wherever possible.

From the point of view of the veterinary profession, it is regrettable to notice that evidently the stud of horses belonging to the Corporation of Sheffield does not come within the full jurisdiction of the Chief Veterinary Officer.

Under the Schedule of Contagious Diseases and the remarks dealing with swine fever, it is stated that 91 cases of deaths of pigs were reported to the Ministry of Agriculture, in compliance with the Swine Fever Order, but only 11 of those cases were confirmed.

In reporting on the scheduled forms of tuberculosis in cattle it is stated that 43 cows were detected to be suffering from tuberculosis and slaughtered under the Order. Of these, 23 were found to be affected with tuberculosis of the udder and 20 with other forms of tuberculosis. The estimated number of cows in the city dairies during the year was 2,474. This shows ·92 affected with tuberculosis of the udder and the percentage of cows dealt with under the Tuberculosis Order was 1·73, this being an abnormally high percentage for dairies in a municipality where a continual veterinary inspection is taking place.

Later on in the report it is stated that of 1,245 samples of milk examined for the presence of coliform organisms, 316 were found to be contaminated. This, on the other hand, is a low percentage.

On page 5 it is stated that " the Tuberculosis Order is a valuable Public Health measure in removing from dairy herds cows which are giving tuberculous milk," but as it is a recognised fact that cows with tuberculosis of the udder are in an advanced stage of the disease, it can hardly be expected that the Order is likely to rid our herds of tuberculous animals, as the animals already have the disease well established before they come under the Order, and there is every likelihood, indeed positive proof, that before they get to this stage they have infected their neighbours. It is doubtful whether the Tuberculosis Order is such a valuable measure as it would appear to be.

We quite agree with Mr. Tweed where he states that some progressive policy is necessary before an appreciable diminution in tuberculous cows can be expected.

It is very encouraging to note the facility and expedition which they deal with many of the cases of cows giving tuberculous milk. When mixed samples are found to be infected or suspected cows are found in dairies, the individual samples of milk taken from the suspected cows are examined microscopically, and where these are found positive it saves the unfortunate and prolonged delay caused by the biological test where the samples are passed through a guinea-pig. By carrying out this method, the veterinary staff in Sheffield rapidly reduce the danger from tuberculous milk in suspected cows. The Authorities have the satisfaction of knowing that the milk of such cows is definitely excluded from the public supply directly they come under the suspicion of the Veterinary Department.

The City of Sheffield is now enjoying the advantages of having erected a new Corporation Abattoir at Cricket Inn Road. The number of private slaughterhouses at the beginning of 1930 was 33 and at the end of the year there were only four private slaughterhouses being used in the city. This is a great advance in the hygienic control of the meat inspection in the city.

During the year there were some 27,482 cattle, 7,622 calves, 60,389 sheep and 23,308 pigs slaughtered in the main slaughter halls, and 634 cattle, 58 calves, 141 sheep and 15 pigs in the Isolation Slaughterhouse set apart from the main slaughter halls and in which all emergency slaughtered animals and any animals suspected to be suffering from disease in the lairages of the Abattoir are taken.

Sheffield is fortunate in being supplied with animals in such good condition that, out of all the animals condemned as unfit, there were only two beasts and four sheep which came under the heading of " Œdematous " and only one beast and no sheep for " Emaciation." Although the tables show 126 cases of Johne's disease, which is indicated by the number of bowels condemned, there were only seven carcasses taken as unfit.

J. G.

Swine fever is taking a heavy toll in the North-East of Scotland. In the first fortnight of October Aberdeenshire had eight outbreaks, and Kincardine six. During the same period there were four cases in the city of Edinburgh, two in Lanark and one in Stirling.

Second International Congress of Comparative Pathology.

These congresses have for their object the study of pathology in its widest sense and particularly from its comparative angle. Consideration is given to diseases common to man and animals, plant pathology, and the possible relationship between certain diseases of plants and those of animals.

The Second Congress was held at the Faculty of Medicine in Paris from October 14th-18th, 1931, under the Presidency of Professor Ch. Achard. At plenary and sectional meetings a large number of reports and communications were presented, dealing with the following subjects: tuberculosis (vaccination), human and animal Brucella infections, milk as a pathogenic agent, mineral deficiency diseases, ultra-viruses, helminthic infections (treatment), cancer, psittacosis, anaphylaxis.

On the opening day members of the Congress assembled at the Colonial Exhibition at Vincennes, where a reception was held. On the second day a visit was paid to the National Veterinary School and to the Veterinary Laboratory of the Ministry of Agriculture at Alfort, where members were received by the Director, Professor H. Vallée. Other pleasurable functions included a reception at the Hotel de Ville by the Municipal Council of Paris and the Prefect of the Seine, a visit to the Pasteur Institute and an official banquet at Claridge's Hotel in the Avenue des Champs Elysées. Arrangements were made for an interesting excursion to Touraine after the Congress.

The British Delegation included Dr. W. H. Andrews, M.R.C.V.S.; Dr. E. J. Butler, F.R.S.; Captain S. R. Douglas, F.R.S.; Dr. F. C. Minett, M.R.C.V.S.; Professor G. S. Wilson, M.D.

At the final plenary meeting the hope was expressed that the next Congress would be held in Italy in 1934.

South African V.M.A.

The following items are extracted from the report of Dr. H. H. Curson, the Secretary-Treasurer of the South African V.M.A., presented and adopted at the Spring Meeting of the Association, held at Onderstepoort:—

"*Faculty of Veterinary Science.*—The Rector of the University of Pretoria has agreed to take up the question of protection for the profession with the Minister of Education; but I have been advised by senior officers of the Department of Agriculture to await the present endeavour to have the Veterinary Bill passed. A sub-committee appointed by the Faculty to deal with protection, has been merged into the Parliamentary Committee.

"*Colonial Service.*—Since May, 1930, the position is that the Secretary for Dominions has agreed that our B.V.Sc. graduates are 'eligible for consideration for appointment to Colonial Veterinary Services or for Colonial Veterinary Scholarships.' A student hoping to qualify in December has made application for one of these scholarships, and it is hoped he will be successful. It is evident a good type of research man is being recruited for the Colonial Veterinary Services, several scholarships being available annually.

"*Service in the Union Department of Agriculture.*—Only one B.V.Sc. graduate has entered the department this year. A statement comparing the terms of service in the various territories of the Sub-continent will appear shortly in the *Journal S.A.V.M.A.* This should serve as a basis for the State Veterinary Committee now provided for in the Constitution.

"Nothing can be done to save the Horse Breeding Industry.

"Realising that the veterinary aspect of native animal husbandry has been scarcely touched, three members of the Association have commenced a series of articles dealing with the problem. Articles of interest in this regard are being collected. Much of the trouble with the native is due not only to the fact that we do not speak his language, but do not understand or attempt to understand his outlook.

"*Department of Defence.*—The only Permanent Force Veterinarian was retired on pension at the end of April, and the only Mobile section S.A.V.C., Active Citizen Force, ceased to exist recently. There only remains the Veterinary Hospital Section, S.A.V.C., with headquarters Onderstepoort. It seems extraordinary that, with our several colleagues who have had military service, nothing can be done to put the Veterinary Corps on a sure footing.

"I regret to say that our Veterinary Corps does not subscribe to the *Jl. R.A.V.C.*, a most excellent publication.

"*Municipal Services.*—Since East London has this year appointed a veterinarian for its abattoir, five towns now have made provision for qualified assistance. A sixth town, Pretoria, employs a practitioner registered under Natal Act 21/1899.

"*Editorial Committee, S.A.V.M.A.*—This is a most capable committee and the Journal of the Association is a credit to the profession. It is regretted that no members responded to the appeal for advertisers in the Journal.

"*Parliamentary Committee.*—Much good work has been done, but I shall not support any step towards introduction of the Bill into the House of Assembly next session, unless I am assured of the whole-hearted support of the Minister of Agriculture. The registration of the Association appeared in the Government Gazette of October 24th, 1930, p. xxi. I have suggested to Mr. Verney the possibility of veterinary protection in the Protectorates on the lines of the Northern Rhodesia Veterinary Ordinance No. 14 of 1930.

"*Status Committee.*—I have suggested that (*a*) this committee should concentrate on the question of representation of the profession on the Public Health Council, and (*b*) Members should write articles for propaganda purposes.

"*Horse Breeding Committee.*—It is desired that a reply should be sent to the Minister of Agriculture regarding his views on the policy outlined by the Horse Breeding Committee.

"*Royal College of Veterinary Surgeons.*—Dr. Bullock, with his usual courtesy, gives me much assistance in matters varying from a coat-of-arms for the Association to details regarding the history of the profession.

"*National Veterinary Medical Association of Great Britain.*—The same remarks as above apply to this body.

The amount of £1 1s. paid by affiliated associations has been waived *pro. tem.*

"In conclusion, it must be stated that never in my experience has the profession generally been so apathetic as at present. There seems to be need for instruction in professional traditions, otherwise with lack of pride in our vocation, we shall surely lose our hard won, although yet unsatisfactory, status. Members accepting office should set an example."

The Editorial Committee, in the course of its report, stated:—

"The first part of Volume II of the Journal, comprising 81 pages, was published in May of this year and the second part will appear as soon after the October meeting as possible.

"Every endeavour is being made to make the journal as attractive and useful as possible to the reader, as well as to the advertiser and contributor.

"With this object in view it is proposed to publish the journal quarterly as from 1932. This will bring it into line with other similar periodicals and enable us to obtain the assistance of well-known publishers, like Baillière, Tindall and Cox, for distributing it abroad.

"There appear to be no grounds for fear that not enough matter for publication will be forthcoming. It is, however, to be hoped that members of the profession generally will gradually get used to the idea of making use of these columns, not only to record interesting scientific observations, but also to air their views on matters of current veterinary interest and importance.

"If in this way the journal can become the real and live organ of the veterinary profession in South Africa and it need stand back for nobody in this respect, its success will be assured, both financially and otherwise."

N.V.M.A. Divisional Report.

North of Scotland Division.*

Meeting at Aberdeen.

The half-yearly meeting of the above Division was held in Marischal College, Aberdeen, on Saturday, October 3rd, 1931.

Mr. A. Sievwright, Tarland, the newly-elected President, was called to the chair by the retiring President, Mr. George Howie. Mr. Sievwright, in a few words, thanked the members for the honour of his election as President.

There were also present the following members: Messrs. J. C. Mitchell, W. Macpherson, J. Lyon, D. Cumming, D. Clark, W. J. B. Robson, W. Anderson, H. McVean, J Grant, D. Crabb, W. Hepburn, R. E. Drennan, W. J. Rice, and J. McAllan, Honorary Secretary. *Visitors*: Messrs. G. Moir and J. D. McLauchlan.

The minutes of the last meeting were taken as read as they appeared in the *Veterinary Record*, and were approved and signed.

Apologies for absence were received from Messrs. H. W. Robson, Laurencekirk, and J. Anderson, Keith.

* Received for publication October 15th, 1931.

Correspondence.

(1) From the General Secretary of the National Veterinary Medical Association, dated April 16th, 1931, and enclosing a letter from Dr. Bullock, Secretary, Royal College of Veterinary Surgeons, anent complaints which had reached the Registrar of the Royal College of Veterinary Surgeons to the effect that members of certain Divisions of the National Veterinary Medical Association are displaying on their notepaper or account forms, letters indicating their membership of the Society in addition to the letters M.R.C.V.S. The letter was duly noted by the members.

(2) From Major J. Gillray McGregor, dated May 11th, with regard to the Branch Representation Fund, asking members of Divisions to subscribe, voluntarily, the sum of ten shillings per annum towards defraying the travelling expenses of the members of the Scottish Branch who had been adopted as Official Scottish Candidates to the Royal College of Veterinary Surgeons.

(3) From the Secretary of the Royal College of Veterinary Surgeons, dated July 4th, with reference to the Sir Frederick Smith Memorial. The hope was expressed that members would see their way to contribute to the Fund.

(4) A discussion took place on a letter from the General Secretary, National Veterinary Medical Association, dated August 18th, with regard to the provision of free veterinary treatment for sick animals of poor persons. In the letter the hope was expressed that a Committee might be formed in every district to formulate a plan to further the objects detailed in the Scheme. After discussion the Secretary was instructed to reply to the General Secretary that as far as our district was concerned no actual need for the formulating of any definite scheme was necessary. The members of our Division expressed the view that in no case would treatment be refused to any animal belonging to a person who was unable to pay a fee. Moreover, it was the feeling of members that the establishment and advertising of such free treatment would only lead to abuse.

New Members.— Mr. Howie proposed and the Secretary seconded the nomination of Mr. George Moir for membership and Mr. Rice proposed and Mr. Drennan seconded the nomination of Mr. J. D. McLauchlan. Both members were duly admitted and welcomed as members of the Division.

Paper.—The President then welcomed Professor W. M. Mitchell, of the Royal (Dick) Veterinary College, who, at considerable inconvenience, had come north to address the members.

[Professor Mitchell's paper, entitled "A General Consideration of the Unsoundness Problem in the Horse," is reproduced, together with a report of the discussion which followed, earlier in this issue.—Ed.]

The paper, as Professor Mitchell would admit, was a difficult one to discuss "on the spot," but the meeting was exceedingly interesting.

On the call of Mr. Rice, Professor Mitchell was most heartily thanked for coming north and, in reply, Professor Mitchell said that it had been more than worth while, since he had seldom been at a meeting where the discussion had been so keen.

A vote of thanks to the retiring President and to Mr. Sievwright for his conduct in the chair concluded a very successful meeting. J. McAllan, *Hon. Secretary.*

Sir Frederick Smith Memorial.

Sixth List of Subscribers.

	£	s.	d.
Previous List (September 7th, 1931)	155	19	0
Derbyshire Veterinary Association	3	3	0
Fisher, Major R. C. U.	1	1	0
Harvey, F. T.	2	2	0
Lloyd-Jones, D.	1	1	0
McDougall, Lieut.-Colonel W. A., D.S.O., O.B.E.	0	10	0
National Veterinary Medical Association ...	26	5	0
	£190	1	0

Shire Horse Society.

At a recent meeting of the Council of the Shire Horse Society preliminary arrangements were made for the 1932 London Show, where the usual generous prizes will be on offer. In classes where the entry justified it, extra prizes would be awarded, and these, together with reserves, commendations, and the prizes in the commercial classes would result in a total of £1,800 being given.

The first day of the Show, Tuesday, February 23rd, will be taken up by the judging of the stallion and gelding classes, while the judging of the mare and group classes will be taken on the next day. The closing day, Thursday, February 25th, would, as usual, be devoted to the auction sale and the judging of the commercial classes. The latter would be the same as this year in all respects except that to meet representations made by Councils outside the metropolitan area the class hitherto restricted to Metropolitan Borough Councils would now be open to any borough or rural council.

The judges for the Show will be Mr. J. Downes Evans, Mr. J. M. Belcher and Mr. T. H. B. Freshney; Mr. T. Eaton-Jones will be again invited to act as Senior Veterinary Officer.

Sir Walter Gilbey, Bart. (Chairman of the Show Committee) reported that during the year Gold, Silver and Bronze Medals and Breeders' Prizes had been awarded at some 200 shows and parades throughout the country, and it was resolved to renew the whole of these offers *en bloc*. In addition, cash prizes had been awarded at the Royal Agricultural Show which brought the total cost of this side of the Society's activities to close upon £1,000. These prizes would again be provided.

As Chairman of the Editing Committee, Mr. A. H. Clark reported that over 1,100 entries had been received for the next volume of the Stud Book, and called attention to the fact that the stallion entry was actually 50 in excess of the number in the last volume. This he considered to be an indication of the general improvement in the heavy horse trade which had already made itself felt in other directions. He also reported that his Committee had that day approved prefixes which had been applied for by the owners of 22 new studs.

At this meeting 73 new members were elected to membership of the Society, making a total of 175 new members for the year.

For representing himself to Iowa farmers as a federal official, J. J. Flanagan, a salesman of poultry remedies, was sentenced to six months in jail. He aroused the suspicion of local authorities by selling so-called poultry remedies while at the same time claiming to be a federal employee engaged in the inspection of poultry for tuberculosis.

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Nov. 9th.—N.V.M.A. Editorial Committee Meeting at 2 Verulam Buildings, Gray's Inn, W.C.1.

Nov. 13th.—Meeting of the Midland Counties Division, N.V.M.A., at Birmingham.

Nov. 24th.—Annual General Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries.

American Veterinary Medical Association.

The October number of the *Journal of the American Veterinary Medical Association* records the proceedings of the sixty-eighth Annual Meeting of the Association, which was held at Kansas City, Missouri, from August 25th-28th, 1931.

The report of the Secretary-Editor discloses that, despite the adverse economic conditions which prevailed during the year, there has been a slight membership accession, the total number of members standing at the fine figure of 4,531.

The Association elected as its new President Dr. Ralph R. Dykstra, who enjoys the distinction of being the first President A.V.M.A. to be elected from the State of Kansas. Dr. Dykstra, who is Dean of the Division of Veterinary Medicine and head of the Department of Surgery and Medicine of the Kansas State College, has, by his frequent contributions to veterinary publications, made his name a familiar one to veterinarians not only in America but all over the civilised world.

It is gratifying to note that the *Journal* has paid the N.V.M.A. of Great Britain and Ireland the compliment of devoting a full page to an excellent facsimile reproduction of the document conveying greetings from the "National" to our American confrères, which Major G. W. Dunkin took with him on his visit to the United States in June.

Edinburgh Degree of B.Sc. in Veterinary Science.

At the recent Examinations for the Degree of B.Sc. in Veterinary Science conferred by the University of Edinburgh, the following candidates passed in the respective examinations:—

Chemistry.—Ian S. M. Taylor.
Physics.—Derek K. Bryson; John D. M. Jack.
Botany.—Duncan B. Macmaster.
Embryology.—Ian H. Chalmers.
Anatomy.—George Briggs; George J. Christie; James Graham; Alexander Kelly; George B. Lewis; William Simpson.
Physiology.—George Briggs; C. N. Chappel; James Graham.
Sanitary Science.—Frederick H. Addison; Walter B. Forrest.
Genetics.—Ian A. Graham.

Royal Veterinary College Appeal.

On November 16th, 17th and 18th, at 8.30 p.m., in the Rudolph Steiner Hall, Park Road, Baker Street, N.W.1, Mr. Geoffrey Edwards, aided by the Hon. Diana Darling and a company of very distinguished artists, will present "The Liar," a comedy in three Acts, translated from the Italian by Miss Grace Lovat Fraser. The performances are held on behalf of the West London Hospital, the Royal Veterinary College, and two other deserving Institutions; and tickets, all numbered and reserved (prices 12s. 6d., 8s. 6d., 5s. and 2s. 6d.) can be obtained from Mrs. Geoffrey Edwards, 34, Tedworth Square, S.W.3, or from the Secretary, Royal Veterinary College, N.W.1.

Mr. Geoffrey Edwards' company is very well known for its previous work in other years in aiding causes which need a helping hand, and it is hoped that members of the profession in London and the Home Counties will not only come themselves but induce their friends to witness what is really a very fine piece of play-acting.

Personal.

Appointments.

The new Veterinary Education Officer for Derbyshire.—Mr. L. B. A. Grace, M.R.C.V.S., D.V.S.M., the newly-appointed Veterinary Education Officer for Derbyshire, graduated in 1924 from the Glasgow Veterinary College where he had a very successful career. After acting as locum tenens in several practices he studied with Professor Gofton, Edinburgh, and Mr. Begg, F.R.C.V.S., Lanarkshire, and graduated D.V.S.M. at Edinburgh in 1926. Subsequently he was assistant to such well-known veterinary surgeons as Messrs. Mayall, Bolton; Barron, Newbury; and Willett, Staines.

While with the last-named he utilised every spare occasion to visit Smithfield Markets in order to further his knowledge of meat inspection.

When veterinary surgeons were wanted to act as meat inspectors in the Chilian frigorificos, Mr. Grace was, on the recommendation of Colonel Young, selected to fill one of these positions.

After two seasons in Chili he was appointed as Veterinary Officer in the Ministry of Agriculture, London, and later resigned this position to return to Chili. Mr. Grace was for a period lecturer and demonstrator in the subjects of Pathology and Bacteriology in the Glasgow Veterinary College. After a further period in July he returned to London and has been for some time assistant to Mr. West, F.R.C.V.S.

With such a varied experience Mr. Grace should prove a good Education Officer and his future progress will be watched with interest by those who know him as an energetic and capable young member of our profession.

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Cumberland C.C. Veterinary Department.—Mr. A. B. Kerr, M.R.C.V.S., D.V.S.M., Senior Assistant in the Veterinary Department of the Cumberland County Council, has been appointed Veterinary Inspector for the County of Cheshire.

Mr. Kerr is a graduate of the Royal (Dick) Veterinary College, Edinburgh. After qualifying there he was engaged in practice at Berwick-on-Tweed, and subsequently held an appointment in the Veterinary Department of the Yorkshire (West Riding) County Council.

* * * * *

A Fermoy Appointment.—At a recent meeting of the Fermoy Urban Council, a letter was read from the Appointments Commission in reference to the veterinary inspectorship, and stating that in compliance with the statutory request received from the Council they had recommended Captain P. C. W. Creagh, Fermoy, for appointment as veterinary inspector for the supervision of meat and milk supplies in Fermoy. His qualifications were M.R.C.V.S., 1925, Royal Army Veterinary Corps (British Army), 5½ years. Had been in general practice in Fermoy and surrounding districts since the beginning of this year.

The Chairman said he was very pleased to see that Captain Creagh had been appointed to the position. The captain's father, the late Mr. P. W. Creagh, had been well known and respected in Fermoy and district for a long number of years and had for a short period previous to his death filled this position of urban inspector of the meat and milk. The council were unanimous in the appointment and the Clerk would inform Captain Creagh.

* * * * *

Captain W. T. Olver's Third Year of Mayoralty.—We are able to record all too few of the activities of our members in public life, and it is therefore with particular pleasure that we note that Captain W. T. Olver, M.R.C.V.S., enters upon the third year of his Mayoralty of the Borough of Tamworth on Monday next. We congratulate Captain Olver on this striking testimony to the confidence and esteem in which he is held by his fellow townsmen.

House of Lords to decide Dental Surgeon Problem.

Although the Court of Appeal upheld a decision restraining Mr. Wilfred Henry Weeks, dentist, of Prince of Wales Road, Norwich, from using the title "dental surgeon," a stay of the injunction was granted for a month with a view to a further appeal to the House of Lords.

Mr. Weeks, a member of the Incorporated Dental Society, and registered under the Dentists Act, 1921, contended that a large number of dental practitioners who have never taken a degree call themselves "dental surgeons."

On the other hand, the British Dental Association claim that the only persons entitled to call themselves "dental surgeons" are those who were in practice before 1378, and were registered under the 1878 Act, or who possess degrees or diplomas.

Age of Pigs.

There is no exact criterion for judging the age of a pig exhibited at a show, and few judges would care to stake their reputation by deciding whether a particular pig should properly be exhibited in, say, an under six months old class. The dentition test is accepted as the fairest criterion, but even so the decisions made at the summer shows sometimes appear unjust to the breeder who finds one of his pigs disqualified for being over age. The Council of the National Pig Breeders' Association has recently amended the standard for young pigs, and this has been accepted by several of the leading show societies. It is also recommended that animals disqualified at a show by the association's veterinary inspectors as being over age should be debarred from competing at a subsequent show in the same year, whether re-examined or not. It is said that several cases have occurred this year in which disqualified animals were successfully exhibited at later shows at which the dentition test was not applied.—*The Times.*

Bovine Tuberculosis Eradication in U.S.A.

Martial Activities in Iowa.

"The work of attempting the reduction of bovine tuberculosis began in 1917, but this did not assume large proportions until 1922," says *The North American Veterinarian.* "In the nine years that have followed more than 40 per cent. of all the counties in the United States have been practically freed from bovine tuberculosis. On September 28th there were 1,248 counties where the tuberculin testing of cattle had been successfully completed and the work continues.

"In most states there is a waiting list of herd owners who have applied for testing. However, misunderstanding regarding the work and lack of appreciation of its benefits have resulted in opposition in a few localities, notably Cedar County, Iowa.

"There are now four states officially designated as modified accredited areas, signifying the practical elimination of the disease. These are Maine, North Carolina, Michigan and Indiana. Four other states, Ohio, Idaho, Wisconsin and North Dakota, have reduced the percentage of infection to a very low degree and are expected to qualify for complete accreditation within a year. In most of the others, favourable public opinion and active veterinary forces are bringing about highly gratifying progress."

* * * * *

The above-mentioned opposition to tuberculin testing met with in Cedar County, Iowa, receives editorial notice in the October number of *The Journal of the American Veterinary Medical Association,* as follows:—

"State Veterinarian Malcolm and certain other Iowa state officials have been getting more than their share of publicity during recent weeks. Cedar County has been unfavourably advertised. The tuberculin test has been

ridiculed and maligned. Doctor Malcolm has been manhandled and subjected to all kinds of indignities and abuse. State officials have been accused of temporising with a situation which called for more vigorous handling. It is reported that the office of the Attorney General sought an injunction to restrain about fifty farmers in the vicinity of Tipton from breaking the laws of the State.

"Under an eight-column head, the Des Moines (Iowa) *Register* stated that Governor Dan Turner had declared martial law in Cedar County on September 21st and had ordered out 2,000 national guardsmen to enforce the tuberculin test law. September 22nd saw the first troops arrive in Cedar County, when a special train of seventeen cars, carrying ten units of the Iowa National Guard, arrived in Tipton, according to the Cedar Rapids *Evening Gazette*. "Everything is all set," declared Dr. Malcolm at 3 p.m., Wednesday, September 23rd, after conferring with his men on plans for proceeding to test a number of herds, under the protection of the militia.

"By noon of the following day, six herds had been tested. A staff correspondent of the Cedar Rapids *Gazette*, located at Tipton, described the local situation as follows:—

> "In a warlike setting marked by bristling machine guns at crossroads, motor lorries of troops, armed sentries and the exclusion of newspaper men from the 'battle lines,' the state of Iowa through its National Guard and its veterinarians moved rapidly and decisively to-day to enforce the bovine tuberculin test law in Cedar County."

"On September 25th, a charge of contempt of court was filed against one of the farmers who had opposed the test of his herd. During the night he had managed to remove his cattle to another farm. However, eleven other members of the 'cow revolt' voluntarily asked to have their herds tested and it appeared as if the backbone of the opposition was breaking.

"By Saturday, September 26th, Dr. Malcolm reported more than one thousand head of cattle in some sixty herds had been tested. It was reported that eight 'units' of veterinarians and soldiers were in the field rushing the campaign to completion.

"The latest report is to the effect that 'the war appears to be over.'"

Inspection of Hides and Skins.

At a recent meeting of the Liverpool Chamber of Commerce the minutes of the Kano (West Africa) Chamber of Commerce on this subject were referred to and attention was called to a report made by the Chairman of the hides and skins sub-committee of the Kano Chamber of Commerce in which reference was made to some prospect of reducing the efficiency of the Veterinary Department through economic cuts. Apparently to meet this deficiency the Kano Native Administration had agreed to guarantee for a period of two years a sum of between £5,000 and £6,000 to maintain the efficiency of the veterinary work. Since receipt of this information the Committee understood that the Kano Native Administration could not legally vote this money. The Committee express appreciation of the offer made by the Native Administration but were of opinion that if any new conditions arose which render such assistance by the Administration *ultra vires* they would like to take the opportunity to emphasise the absolute necessity of the Government maintaining the present efficiency of the Veterinary Department so that the present high standard of excellence of the country's hides and skins should not be impaired.—*West Africa.*

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses:—London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

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Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents.

Tuberculosis in Swine.

To the Editor of The Veterinary Record.

Sir,—Mr. Dundon in his interesting paper on "Tuberculosis in Swine," reported in this week's issue of the *Veterinary Record*, raises the question of the incidence of the disease in the various lymphatic glands of the carcass, etc. He differs from my statement that the commonest site of tuberculosis in the pig is in the submaxillary glands, and states that he finds the mesenteric glands more frequently affected.

As he is not the only Free State Veterinary Officer to raise the same point, I venture to suggest that the reason for this difference is the method adopted for examining the glands in question. In pigs examined by the Free State Veterinary Officers the head is examined whilst still attached to the carcass; thus it is an easy matter to miss some lesions, especially tiny ones.

Here, after slaughtering and scalding, etc., the head is completely severed from the carcass and the glands washed free of blood and examined under a specially constructed light. With "porkets," the head is examined whilst still on the carcass, as for Free State pork pigs. I am frequently called upon to examine heads that have been cut off Free State pork pigs; such heads bear the Meat Inspection Stamp of the Free State, and show signs of having had the submaxillary glands cut into; nevertheless, some of them are found to be tuberculous.

Yours obediently,
D. J. Anthony.

Marsh and Baxter, Limited,
Veterinary Department,
Brierley Hill, Staffs.
October 31st, 1931.

A Too-absorbed Borrower.

To the Editor of The Veterinary Record.

Sir,—Some time ago a member borrowed from the College Library a volume containing the Reports of the Proceedings of the National Veterinary Medical Association for the years 1882-1886. The volume has not been returned, and the card giving the name of the borrower has been mislaid. If the borrower reads this, he will no doubt return the volume. Failing this good fortune, may I ask any other member who possesses copies of the Reports for any of the years 1882-1886 to be so good as to present them to the Library of the College?

Yours faithfully,
Fred Bullock.
Librarian.

War Memorial Library,
Royal College of Veterinary Surgeons,
10, Red Lion Square,
London, W.C.1.
November 2nd, 1931.